

**A FRAMEWORK FOR APPLYING SPATIAL DECISION SUPPORT
SYSTEMS IN LAND USE PLANNING**

by

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ABSTRACT

For local authorities to manage land policies effectively data bases of land use information that are current and mirror development on the ground are required. At present local authorities have no mechanisms in place to acquire maintain and spatially link land use information. Detailed land use information is not generally available at the local level. Generally little attention is paid to maintaining the expensive data which is assembled when planning schemes, development plans or projects are prepared.

Land use planning has traditionally focussed on the control rather than the facilitation of development. Details of the actual land use on the ground are generally ignored as tariffs for tax purposes are set on the zoning of the land or a flat rate rather than the actual land use.

This lack of land use information, which is exacerbated by informal settlement, causes delays in approving new land uses. There is generally no data available for informal areas and land use and tenure is subject to the informal rules that have evolved with such settlements. If these areas are to be included in the formal land management systems, ways of including and maintaining land use information about these settlements must be developed.

By reviewing land information theory, the South African legal land development framework and using a small town as a case study, I have shown that provided certain conditions are met a Spatial Decision Support System (SDSS), designed to record and maintain the land use data necessary to support land use planning in both formal and informal contexts, could be a valuable land management tool. Such a system should be implemented in partnership with local communities and should;

- support local level land use decision making and regulation
- serve as a land management tool to integrate formal and informal communities
- have mechanisms to keep land use information current
- be transparent about the type of land use information
- develop linkages with regional government to provide detailed land information over time.

PREFACE

This research was carried out in Pietermaritzburg whilst working for the Development and Services Board. The purpose of the research was to develop an information system capable of assembling and maintaining the land use information to inform land use planning at the local authority level..

The research was supervised by M. Chilufya of the University of Natal (Durban) who took over from Dr. C Fourie on her resignation from the University.

I declare that this dissertation comprises only my original work except where due acknowledgement is made in the text to all other material used. This dissertation has not been submitted in part, or whole to any other University.

Peter Peacock
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LIST OF ACRONYMS

The following acronyms were used in this dissertation.

ABM	Area-Based Management and Development
AM/FM	Automated mapping/facilities management
ANC	African National Congress
CAD	Computer Aided Draughting
DFA	Development and Facilitation Act
DSB	Development and Services Board
FIG	International Federation of Surveyors
GIS	Geographic Information Systems
GPS	Global Positioning Systems
IDP	Integrated Development Plan
KLA	KwaZulu Land Affairs Act
KZNPA	KwaZulu-Natal Provincial Administration
LDO	Land Development Objective
LFTA	Less Formal Township Establishment Act
LGTA	Local Government Transition Act
LDP	Local Development Plan
LIDP	Local Integrated Development Plan
LIM	Land Information Management
LIS	Land Information Systems
LWDF	Lidgetton West Development Forum
MEC	Member of the Executive Committee
NGO	Non Government Organisation
NLIS	National Land Information System

PDA	KwaZulu-Natal Planning and Development Act
PPA	Physical Planning Act
PPM	Participatory Planning and Management
PRA	Participatory Rural Appraisal
RDP	Reconstruction and Development Programme
SDSS	Spatial Decision Support Systems

Chapter 1

Introduction

1.1 Background to the research

In South Africa access to and the rights to develop land was systematically denied to people of colour from colonial times. This situation changed with the political changes brought about by the election of a representative national government in 1994. The African National Congress (ANC) government, recognising the difficulties of redressing the imbalances caused by the denial of access to land, implemented the Reconstruction and Development Programme (RDP) to provide housing and economic opportunity to the poor. These development programmes, together with informal development, have increased the pressure on land management processes that approve and regulate the development of land. In common with other countries, the South African Government has recognised that the present systems of land management cannot respond to increasing pressure on natural resources and the environment as the result of changing social and economic conditions.

To enable government to govern effectively "...a predictable and honest administration of the regulatory framework" (UNCHS:1991:6) is required. The importance of quick informed decision making, particularly at the local authority level, is implicit if the administration of a regulatory framework for local land development is to function effectively and gain widespread acceptance. New legislation and procedures are being introduced by government to restructure local government in South Africa. Previously distinct local authorities have been combined into single entities with greatly extended areas of jurisdiction. Since the December 2000 local authority elections, the entire country has been placed under the jurisdiction of either or both a local or district municipal authority. Unfortunately the process has not recognised that current land use information is required to inform land management decision making. The exclusion of development in informal settlements from existing land management regulatory procedures further limits the availability of land use information required by local authorities for effective land management. In the view of UNCHS (1990:4) "...a priority area for national policy action will have to be the establishment of efficient land registration and land information systems at Municipal level."

Land provides the foundation for all forms of human activity but methods of managing it have not responded to changing social and economic conditions (Dale & McLaughlin:1988). The development of land is defined by UNCHS (1991:6) as "...the process of turning raw land i.e. unused land or land used predominantly for rural and agricultural purposes into land used for urban purposes; principally but not exclusively for the urban poor but not excluding public industrial and commercial purposes." This land development process involves obtaining access to the land, approval of the development and the ongoing regulation of its use. It is suggested that the two themes that set the parameters of discussion of development issues are "...sustainable development and efficient equitable governance"(ibid). To ensure decision making bodies and local communities are able to make informed decisions and choices about what land development is sustainable and equitable they must be informed by current land use information. As noted by UNCHS (1990:15), "strategic decisions are only as good as the data and the information upon which they are based. " In present land management systems decision-makers are distant from the actual land users and are not directly accountable for the consequences of their decisions. The availability of land use information for local

level decision making will help to ensure that land management decision-makers will be more accountable than is currently the case.

1.2 Research problem

Local authority land information is based on information maintained by the cadastre which does not include information on what the land is actually used for. Land use information in informal areas and on land not defined by cadastral boundaries is excluded by definition and is not available to decision makers. In my planning position I have observed that the ongoing changes to local government structures during the transformation process have not always taken cognisance of the value of information collected and in some cases maintained by local authorities. In many cases this information has been lost as its value to land management was not properly understood. It is against this background of change, informal development, delays in approving development applications and inequitable land use regulation that this study focusses on a way to provide current land use information to support land use planning decision makers.

1.3 Research objective

The objective of this study is to develop a framework for spatial decision support systems (SDSS) that is designed to assemble and maintain information about existing land uses. For this concept to be an effective land management tool to support local level land use planning decision making and the regulation of land uses for all communities (formal and informal), it should accommodate the following criteria. It should firstly, provide current land use information to speed up land development applications and promote more efficient land use regulation. Secondly, assist with the integration of formal and informal land use approval and regulation systems by developing a partnership between formal and informal communities. Thirdly, establish mechanisms for maintaining current land use information and fourthly, create the linkages between local authorities and other tiers of government to add value to their information systems by providing reliable current land use information.

1.4 Research questions

There are currently no existing local authority level systems to provide current timely land use information to support the development and regulatory processes of land management. New legislation identifies local government as the level of government best suited to implement land management. The intention of the legislation to devolve land management and decision making to this level raises the question of how the land use information necessary to inform these structures is to be provided.

Lidgetton West, a town in the KwaZulu-Natal midlands, was used as a case study of the land management difficulties experienced by a local authority administration approving and regulating land development for both formal and informal communities. The sudden appearance of informal settlements in Lidgetton West during 1996 resulted in a proposal to develop a low cost housing scheme to resolve the issue of homeless people. During the process of engaging with the leadership of the informal settlements, the ratepayers of the town, and farmers associations adjacent to the town, the following two issues were highlighted. Firstly, the need for land use information and its spatial linkages with social information about the different communities in the town to inform the land management decision making processes, and secondly, the inappropriateness of the standards

being applied, or not applied, to the development and regulation of land. It is these questions which are addressed by this study.

1.5 Research methodology

To develop a system capable of providing current information about the actual uses taking place on land I review the theory of decision-making, decentralisation and the effect of institutional structures on land management and land information systems. As literature on land use information is limited, the theory on systems recording information for the use of natural resources and land registration is reviewed and extrapolated to develop the concept of a local level system recording land use information. The South African legal framework for land development and regulation is examined and as mentioned above, the small country town of Lidgetton West was used as a case study to outline the framework that could be used to support land use planning and control at the local authority level. The methodology used in the case study includes, personal observation, questionnaires and participatory management techniques.

1.6 Dissertation Structure

Chapter one has given a brief background of the current restructuring process of local government land management procedures in South Africa and outlined the need to integrate current land use information about both formal and informal development, to inform local level land development and regulatory decision-making, into a single land management system. The research problem and object of the dissertation have been outlined and the chapter concludes with outlines of what is discussed in the following chapters.

In chapter 2 land use planning is defined and its role in approving and regulating the development of land and its uses is examined. The participation of communities in decision-making, decentralisation and the necessity for traditional 'top-down' institutions to be adapted to allow this is then discussed. It concludes that for land development and regulation procedures to be effective in providing for the rapid release of land for sustainable development into a single accepted land management system, 'top down' management systems must be adapted to allow both informal and formal communities to participate in land development and regulatory processes.

Chapter 3 describes new and current land legislation at the national, regional and local levels that affects the approval and regulation procedures for land development and regulation. The intention of the new and proposed legislation is to encourage cooperative governance and involve communities in the land management process. Local authorities are seen as the most suitable level of government for this purpose. If they are to manage the co-operative governance process successfully, the need for land use information to develop local land development solutions, educate communities and inform decision making is vital.

In chapter 4 an outline of a framework which could be applied to (SDSS) is developed by reviewing LIS. The functions, features and characteristics of a conceptual framework, capable of assembling land use information of actual land uses at the local level. for SDSS in land use planning is then described. A SDSS developed using community oriented approaches could be a valuable land management tool to integrate formal and informal communities and educate them about civic responsibilities.

Chapter 5 gives a brief history of Lidgetton West, a town in the KZN midlands used as the case study area. The structure of the local authority administering the area and the difficulties it experienced in equitably approving and regulating development in the formal and informal areas that comprise the town is then described. Finally the planning process and methodology used to assemble land use information to inform a housing project and define new acceptable land use development and regulation standards are discussed.

Chapter 6 concludes the dissertation and identifies the integration of formal and informal development and regulatory systems in South Africa as a priority. The effects and characteristics of informal land development on local authorities and the importance of land use information to support the rule of law is then outlined. Four factors which could positively influence land management when applying the outlined framework for SDSS in land use planning, and areas of research which would further its development, conclude the chapter.

Chapter 2

LAND USE PLANNING, DECISION-MAKING, DECENTRALISATION AND INSTITUTIONAL ORGANISATION

2.1 Introduction

In this chapter I define land use planning as well as its component parts which are known as development planning and development control. I then examine the influence of the themes of decision-making, decentralisation and institutions on land use planning and management.

The first theme examined in this chapter is the importance of effective, accountable decision making in land use planning for the effective management of the approval and regulation of different land uses, particularly where, as in South Africa and the case study area, both formal and informal land use patterns exist.

The second is decentralising land management by devolving some decision making powers to lower levels. This is a theme evident in the new legislation which is being developed to direct land use planning policy and its role in the approval and regulation of land use and is discussed in the following chapter. Decentralising and redefining the role of the state is occurring in nearly all countries and local government is seen as the most appropriate level of government for land management (UNCHS:1996:294). This is particularly relevant in KwaZulu-Natal (KZN) where land use planning has historically been a top-down exercise.

The third is the role and function of institutional organisation and its effect on decision making for land use development and regulation. These decisions, which are by their nature political, are tightly controlled by land laws. The effect of laws on public bureaucracy and discretion is aptly outlined by 'de Sotho' in 'The Other Path' quoted in (UNCHS:1991:171)

the distinction between laws which attempt to deal with particular matters and laws which deal with general matters; the former inevitably he argues give rise to more and more laws and greater and greater administrative discretion as different groups in society, including the public bureaucracy, argue for their own special interests to be protected or advanced by the laws. ...Less law; law which concentrates on general principles and eschews excessive discretion is the way forward.

X “Everywhere in sub-Saharan Africa the major problem remains access to infrastructure and services, rather than security of tenure per se” (Durand-Lasserve:1997:1). In developing countries “decision makers at central government and city levels, planners, surveyors, ... are facing a situation they have not always been prepared to deal with: a significant portion of the city-dwellers in developing countries, at times the majority, are excluded from legal, regular processes of access to land and housing; they live in ‘irregular settlements’ with little or no infrastructure and appropriate services” (ibid). This poses major land management and planning problems, both administrative and financial, for public authorities at all levels.

The approval and regulation of the use of land in both the urban and rural contexts operates within legislative frameworks or customary traditions which have evolved over the years. This formal legislative framework forms the basis for the land use planning component of land management. This legislative framework in South Africa has been recognised as being ineffective in providing a

framework to facilitate and regulate land management throughout the country. If land use planning is to be effective land use information should, from the local level upwards, be available to all land management policy decision-making levels. Such a land use information system that supports decision-making could be a valuable land management tool to assist with speeding up the release of land for development, informing funding applications, improving service cost recovery as well as providing the means for ongoing effective, transparent land use regulation.

There is currently no system in South Africa which provides large scale, detailed, current land use information for land use planning. This lack of land use information is not peculiar to South Africa. As observed by Dale and McLaughlin (1988:68) "...land use records throughout the world are usually poor or non-existent." A consequence of a lack of land use information is poor land management. This is manifested by difficulties in taxing property, maintaining infrastructure, undertaking pro-active planning and acquiring land for public purposes (Williamson:1992:3). Information is also needed when changes in land use are planned or proposed (Dale and McLaughlin:1988:69). In this dissertation I am arguing for an effective SDSS in land use planning to support decision making and improve land management. A local authority level SDSS, should be designed primarily to record and maintain a range of current land use information to support land use planning decision-making and regulation.

Since the political changes in South Africa brought about by the election of representative national and local government in 1994 the difficulties facing effective land use planning and regulation have been recognised. Land development objectives (LDO), integrated development plans (IDP) and local development plans (LDP) have been seen as vehicles to speed up decision making and assist in the approval and regulation of land uses. These processes have not been as effective as they might have been. One cause is the lack of current information about existing land uses, formal and informal, to inform the approval and regulation of land use development in the existing land use management system.

"In both the public and private sectors land information is a prime requisite for making decisions related to land investment, development, and management" (ibid). Records of land development applications and its actual current use is an important component of the land information referred to by Dale and McLaughlin (ibid). For pro-active physical planning and regulatory systems to function effectively spatial information about the land uses existing on the ground is vital if land management decision making processes are to be properly informed.

Rapid urbanisation and the inability of present land use control systems in developing countries to regulate and accommodate the timely release of land for development means that the need for creative thinking to develop new better ways to administer land use development planning has never been more urgent. The need to reform both registration and regulatory systems is implied in developing countries where 20% to 80% of land delivery is informal (UNCHS:1996:292, Fourie:1998:55). The regulation of land use using the traditional 'top-down' approach to spatial planning known as the land use planning approach, is no longer adequate (Pieri:1997:223). 'Top-down' approaches encourage dependency on government and ignores local knowledge and inventiveness as a dynamic land use option. Governments often do not have the resources, financial or human, to administer this approach (DeWit:N.D:3). An alternative to the 'top-down' approach is the greater involvement of communities in both the spatial planning and regulation of different land uses. This will allow a role for the local knowledge and inventiveness of communities to ensure the proper use of land. The corollary of either approach is that it must be effective so that "...people making use of it can achieve results; decisions are reached relatively quickly, they are accepted, ie they are recognised as being the product of an honest and competent decision making body, and they can be implemented" (UNCHS:1991:172).

Land is a fundamental resource which can only be administered properly by improving land information policies, building the necessary institutional arrangements to implement these policies as well as developing effective and efficient systems for their implementation (Dale and McLaughlin:1988:183). Robust information, available when required, is more important to decision-making than completeness (Pieri:1997:223). As stated by Dale and McLaughlin (1988:2) “the value of information and the effectiveness of decision-making are directly related to the quality of the information and the manner in which it is made available.” Information reduces uncertainty by helping to identify and analyse problems (ibid:1). “Decisions on sound land management are preferably made by comparing options, analysing potential benefits and impacts on various issues. Solid and reliable information is a prerequisite for good decision making at whatever level” (DeWit:N.D.:13). “The management of land resources and the administration of land requires information to support the decisions involved” (Ezigbalike:1996A:333). These views emphasise the importance of the effective management of land use information which directly affects the performance of land use planning which is concerned with the control and regulation of land use.

2.2 Land use planning

Land use planning is the component of land management involved in the approval and regulation of urban and rural land use. In this section I examine broad definitions of land use planning as well as specific definitions of its two component parts, development planning and development control.

2.2.1 Definitions of land use planning

Land use planning is ‘the systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adopt the best land-use options’ (FAO:1993, Ezigbalike:1996B:349). The White Paper on Spatial Planning and Land Use Management (2001:92) defines land use planning as the “planning of human activity to ensure that land is put to the optimal use, taking into account the different effects that land uses can have in relation to social, political, economic and environmental concerns.” Ratcliffe as quoted in Dale and McLaughlin (1988:6) see planning in the urban environment as being

...a reconciliation of social and economic aims, of private and public objectives. It is the allocation of resources, particularly land, in such a manner as to obtain maximum efficiency, whilst paying heed to the nature of the built environment and the welfare of the community. In this way planning is therefore the art of anticipating change, and arbitrating between the economic, social, political and physical forces that determine the location, form, and effect of urban development.

These three broad based definitions of land use planning all emphasise the social aspects of planning. Land use planning is separated into two different activities, development planning and development control, which operate within a legislative framework of land law.

a) Development planning

In development planning, the physical environment, including the presence or absence of transport water and other utilities, is evaluated and a plan prepared about how different land uses and development can best be implemented in the public interest. (Dale and McLaughlin:1988:7). This type of planning effectively stipulates the broad outline of the land use policy to be applied. These policy plans operate at various levels and are variously known as regional, sub-regional, structure, framework, development or land use plans. At the lower level, large scale zoning plans outline

specific land uses permitted in specific areas.

b) Development control

Development control is the implementation of what has been decided in the outline or policy plan (ibid). In the event of there being no planning framework or zoning, control, the subdivision and development of land is controlled in terms of conditions of title and whatever national, regional or local legislative frameworks exist to authorise and regulate the development of land and resources.

I use the term 'land use planning' to include both development planning and development control. Although there are differences between the two, both deal with the approval and regulation of land use. From the above outline of land use planning the need for land use information about the land to be planned and regulated is implicit if decision-making processes are to be carried out effectively and timeously. In chapter 4, I will outline a framework for SDSS which can be designed to provide the necessary land use information at the local authority level to support both community and local authority level decision-making about the planning and regulation of land use. This system could also form the basis of a more efficient land administration and service cost recovery for local authorities. It will also add value to existing distributed LIS provided the necessary linkages and exchange standards are developed. The efficacy of local authority land use planning and land management is directly affected by the processes of decision-making, decentralisation and the institutions needed to carry out and administer the land management policy. These themes are examined in the following sections.

2.3 Decision-making

For land use planning to be effective I am arguing that decision-making about land use rights needs to take place close to and be accessible to communities. I will show that provided certain conditions are met accountable, low level decision-making for land development and regulation has a crucial role to play in integrating formal and informal development.

Marslow's hierarchy of needs concept, used by Pieri (1997:221) is useful to decision-making in land use planning and management. The maintaining of higher order needs, such as collective responsibility for ensuring everyday behaviour, is only possible when lower basic needs for food, shelter, stability and health have been satisfied (ibid:224/224). This is also true in the context of the economic development of land. For a community to fulfill their responsibilities their basic needs must be satisfied. In the case study, presented in chapter 5, it was only possible for this to happen as the local authority was in a position to provide health clinic facilities and make provision for a low-level water supply to satisfy some of the community's basic needs. This stimulated wider community interest in developing an acceptable solution to improving poor existing social and housing conditions.

The presence of both informal and formal land use patterns in South Africa, as exists in the case study area, indicate, that "...a means of intervention which ensures the development of synergy between formal and informal channels of land and housing development" (Durand-Lasserve:1997:8) needs to be found. I am arguing that by involving communities in assisting with the collection and maintenance of land use information, a synergy between the formal and informal channels of land and housing development can be developed. A community actively involved in assembling and maintaining land use information will be able to provide input about the criteria to be applied in land use regulation as well as decisions about future land use development within the limits of broader policy. Any decision outside or in conflict with the limits of the broad land use policy will be subject to ratification by existing statutory authorities. Provided vertical links are developed the land use

information collected and maintained by the community could ultimately be used to inform higher level statutory authorities land use decision processes.

As noted by Ezigbalike (1996B:349) "The awareness of the role of information in general decision making is very low in Africa. Most decisions are made on the basis of interest groups and political expediency, rather than on objective decision analysis." Ezigbalike goes on to say that "what is required is the introduction of low-level, community-initiated planning, with informed decision-making. With that, information management will develop to support decision-making processes" (ibid:352). From my experiences of the land use planning process this lack of awareness of the role of information also pertains in South Africa in both the rural and urban contexts. Local populations have the wrong impression that the actual work is the only important thing as the information and decisions to implement projects are not visible (ibid:350,351). If "...possible, the land rights database and registration system should be compiled at the same time as land use planning, but if resources are limited.... priority should be given to information requirements for land use planning over 'cadastral' arrangements" (ibid:349). This statement emphasises the importance of land use information to land use decision-making if the approvals and regulation of the different economic uses of land are to be speeded up.

"As the cost of collecting, validating and using data and information,..... imposes strong limitations on the quantity of information..." (Pieri:1997:225) only information relating to achieving the objectives identified should be collected. The emphasis should be on timely, demand-driven information resulting in qualitative data and information rather than comprehensiveness. These arguments hold true for land use information. Costs are an inhibiting factor especially if policy makers cannot see any benefits being realised from the data. The reasons for acquiring information must be clear and conform to local authorities responsibility to speed up land use development approvals and provide for the efficient regulation of land uses. The "...elusive measures such as human values, attitudes, beliefs, judgement, trust, and understanding"(Berry:1993:76) need to be included in the decision-making environment. Three inputs into this environment are, "...the scientific, the social, and the legal components of society"(ibid:75). In the land use decision-making environment there is often no balance between the technical and socially acceptable sectors. "A technical solution often meets social acceptance in a loggerhead. The result is an injunction, and the legal sector is called to make the management decision" (ibid:76). For decision making close to the community to be effective a participatory approach which "...facilitates the integration of the social and institutional dimensions of land management with the technical" (Fourie:1998:9) is required. The idea that "social as well as economic effects, in the same way as environmental effects, should be considered in determining planning applications" (Wai- Chung Lai:1998:272) supports this view.

"Participatory decision making has two main thrusts: consensus building and conflict resolution. Consensus building involves technologically driven communication and occurs during the alternative formation phase of the decision-making process" (Berry:1993:77). I am arguing for a participatory planning and management (PPM) approach that integrates the social and technical dimensions of data to inform decision making. By using this approach different possible outcomes that could arise could be used to focus discussion on possible acceptable solutions and resolve potential conflicts arising from different proposed or actual land uses.

2.3.1 Participatory planning and management (PPM)

Participation is viewed "...as the involvement of the projects beneficiaries in decision-making, implementation and evaluation."(Garcia-Zamor:1985:3) There are two types of participatory planning and management (PPM), firstly the type that induces participation and secondly, the type that merely requests or encourages suggestions. The first can be encouraged by formal committees

who encourage local communities to provide input into projects (ibid). A form of PPM is the participatory rural appraisal (PRA) which is described as a technique that "...operates on the premise that problems in ... areas are endemic and ongoing." (Fourie & van Gysen:1996:355) The PRA process is more than a consultative exercise. "Instead of outside professionals (specialists) obtaining information about a local area by using field workers, then fitting this information into an official land management plan of action..." (ibid) in which communities can participate, the planning initiative is given by facilitators to the locals. Encouragement to use the knowledge of local practises often results in the development of innovative and sustainable solutions. The use of PRA "...and the information collected, can then have a direct impact on the ability of a local community to manage its problems, including land management issues" (ibid:356).

The objectives of PPM management listed by Garcia-Zamor (1985:5-9) are that it firstly, promotes integration, secondly, improves performance and the acceptance of performance criteria, thirdly, deals with and responds to community needs and problems, fourthly, results in a higher quality product, fifthly, improves the quality and quantity of information, and sixthly, permits greater use of local human resources. If the six objectives outlined above are to be achieved a characteristic of a SDSS for which the framework is outlined should be that PPM techniques are used in the assembly and maintenance of land use information which will be used to inform decision-making.

If PPM is to be used effectively four major obstacles need to be addressed. These are the dominance of one group over others, lack of interest from participants, lack of time and restrictions from present structures and systems (ibid). My experience in the case study is that restrictions from present structures and systems and the dominance of the controlling informal group present the greatest obstacles to the use of community oriented approaches.

Land resources management decisions at all levels are the direct results of a negotiation process between different stakeholders involved in various ways (directly and indirectly). The essence of negotiation is that the interests of all stakeholders are fairly discussed without preconceived bias. This implies, firstly, that the stakeholders have to be identified, secondly, that conditions are present for them to effectively participate as genuine partners, and thirdly that all are fully informed on the issues at stake (DeWit:N.D.:12).

I argue that these implications hold true for land management decision-making. If the use of PPM techniques are to be successful the "outcomes of local negotiation processes must be accepted by hierarchical higher bodies, ...within a given set of rules established at..." (ibid) a higher level.

"Each group of stakeholders assess their needs on the basis of perceptions and understanding of the land use issues and the availability of information." (Pieri:1997:224) This approach relies on "...building partnerships for the development and delivery of innovative technologies drawing upon an interactive establishment of major 'stakeholders' needs..." (ibid:225). Pieri goes on to note that "...only critical information, ie information that most directly (efficiently) relates to the issue in hand is needed,..." (ibid). By involving the communities in the case study (see chapter 5) in the process of gathering data they were able to assist with firstly, the prioritising of needs, secondly facilitating the process of integrating formal and informal communities, thirdly developing an awareness of conflicting land uses and resolution mechanisms, fourthly, revising infrastructure and service standards and land use regulations not adaptive to the needs of the different communities. This approach is foreign to the present methods used by most local authorities. If new approaches to land management are to be developed the role of the local authority must be adapted to use PPM techniques.

2.4 Decentralisation

Top level or central decision makers tend to need quantitative information rather than the timely demand driven qualitative information and semi-quantitative information needs of local decision makers for action programmes, conflict resolution and consensus building. These two approaches to information needs should not be seen "...as competitive but as complementary, and implemented within the broader framework of a comprehensive and decentralized information system on land related issues" (ibid:225). At the local authority level the emphasis should be on knowledge sharing and demand driven information required to inform and speed up land use development approvals and the efficiency of land use regulation.

As the human population increases ever increasing pressure is being placed on land, resulting in increasing "...competition and conflicts to access and to use this finite life supporting resource" (ibid:223). The development of informal settlements which house both the rural and urban poor are physical manifestations of this competition and conflict over the right to use land. As stated by Pieri (ibid: 223) "there is a need to move from a prescriptive approach towards an integrated approach to the physical land use planning and the social and institutional dimensions of land management" Some of the problems facing government and traditional >top down= land use planning are a result of the following;

- ▶ land use planning is not demand driven and is largely imposed by governments which often lack the funds and human capacity to implement plans (De Wit:N.D.: 5);
- ▶ it is neither quick nor flexible and "land use or planning decisions take an enormously long time" (Fourie:98:8);
- ▶ land use decision-making is centralised and there is no local accountability for decisions taken;
- ▶ "overlapping responsibilities can also jeopardise clear decision making"(De Wit:N.D:5);
- ▶ the situation on the ground is not taken into account because of a paucity of 'de facto' land use information ;
- ▶ good governance is undermined if different types of land management plans prepared at government expense are not given any legal status and cannot be implemented.

'Decentralisation means the devolution of powers, functions, resources and administrative programmes from central government to regional local authorities and even to lower tiers at the community level' (UNCHS:1996:294, Fourie:98:9). Most countries are "...decentralizing and redefining the role of the State, partly due to the fact that so many central land management policies have not met expectations... Such decentralisation should allow the creation of better vertical co-ordination between 'bottom up' information and local interest and 'top-down' information and policy guidance which can harmonize overall national development policy with local programs" (Fourie:1998:9,10) In South Africa "in the long term, the vision is for a decentralisation of functions to the local government level" (White Paper on SA Land Policy:1997:101). The acceptance of decentralisation is also evident in the Durban Metro Council. The Council "...is presently considering a model of Area-Based Management and Development (ABM) that seeks to combine the advantages of centralisation and those of substantive decentralisation" (Hindson:2001).

To inform higher authorities of both the negotiation process and the approval of locally agreed land use proposals, a detailed record of existing land uses, local knowledge and existing and possible future conflicting land uses is required. "For land registration and/or recordal to work in Africa the system itself should become more accessible, both in terms of location, cost and user

friendliness”(Fourie:1998:11). I am arguing that this statement could be applied to a SDSS, capable of assembling and maintaining land use information if it is to gain widespread local acceptance. It will be decentralised and supported at both the local and regional levels with possible future linkages to the National Land Information System (NLIS). By involving affected communities in assisting with the assembly of land use information I am arguing that land use management systems will be more easily accessible to communities requiring information to inform their opinions and assume civic responsibilities. The process will also serve to inform locals of the governments broad land management policy decisions and plans. To enable such a scenario to develop the issue of how institutional organisations can be adapted to accommodate some form of decentralised land use management system is critical.

2.5 Institutional organisation

“The management of urban land involves highly political decisions about scarce resources and however much, in theory, it is desirable that such decisions are taken on ‘rational,’ ‘objective’ grounds, reality will break in on theory and in practice decisions will be ‘messy,’ a compound of the rational and objective and the ‘irrational’ and ‘subjective’” (UNCHS:1991:84). Institutions need to be adapted to develop and implement effective land information policies and systems to optimise land management (Dale and McLaughlin:1988:183,184). In this section a definition of institutions as well as principles identified in literature for enhancing institutional management frameworks functions and responsibilities will be reviewed. The functions of national, regional and local level institutions will then be examined.

2.5.1 Institutions

Dale and McLaughlin (1988:183) use the term 'institution' to refer “...to the established laws and customs and the administrative structure needed to support them. It includes various aspects of organizational behaviour that influence and control the freedom of the individual, particularly in the context of what is allowed to be done with the land.” DeWit (N.D.:9) says that “institutions deal with co-ordination, implementation, regulation, monitoring, conflict resolution, negotiation of land resources use and management”. Institutional rather than technical problems are considered by DeWit to be the most serious difficulty in resource management.

Land development decisions and land use regulation play a direct role in resource allocation and approval. Approvals of land use are regulated by the conditions of approval and/or zoning. The decisions, taken after institutions and institutional procedures to adjudicate land use issues have been followed, can have wide, varied and unpredictable effects. These decisions allocate land and resources, actions which affect the rich and influential as well as the poor and non-influential. The fear of interest groups and communities to changing established procedures ensures that any changes in institutional frameworks have to be provided for by constituent law. This results in institutional problems being far more intractable than technical ones. Land management institutions need to be adapted to accommodate a system capable of recording and maintaining land use information to support decision makers. The functional adaption, development of vertical and horizontal partnerships, and empowerment of institutions to fulfill their roles are considered to be vital elements for the enhancing of institutional resource management frameworks (DeWit:N.D.:9). In my experience these elements are also critical for local authorities if they, as proposed by the new land legislation, are to carry out their envisaged role of co-operative and participatory land management.

UNCHS (1991:84,85) says that if institutional frameworks providing for >top-down= decision making are to be redefined the following principles should be provided for;

- (a) an input of information and ideas from all relevant bodies and persons to the decision-maker;
- (b) a transparency of the criteria to be used by the decision makers;
- (c) the delegation of decision making in non-policy areas to a level as close to the consumers as possible;
- (d) audit and review of the process to ensure its effectiveness and efficiency.

A feature of any 'top-down' institution adapting itself to decentralised decision making should be the establishment of a SDSS in land use planning to provide the relevant information to support delegated decision-making. Similarly any institution establishing a SDSS will have to simultaneously adapt its procedures to accommodate it if it is to function effectively. In most countries there are 3 levels of institutions all of which have concerns with land management.

2.5.2 Institutional levels of land management and land use planning

In South Africa, as in most countries, government institutions exist at the national, regional and local levels. All three levels have a stake in land management and policies that have direct effects on the viability of a SDSS. In this section the respective responsibilities of each level are briefly outlined.

a) National level functions

A function of central governments is to "...define and formulate national policies and provide the institutional and legal frameworks for decentralization" (UNCHS:1996:294). They must also ensure that local authorities have the necessary resources to finance local urban land programmes (ibid:295). "A recurring problem in other countries has been the inadequacy of survey and land tenure records and a lack of information on what exists on the ground and how land is utilised" (White Paper on SA Land Policy:1997:106). Toward this end a NLIS is proposed to coordinate land information in South Africa (ibid:108). The NLIS should form the national basis for the land management component of development planning and land regulation.

b) Regional level functions

For the regional level to function its rights, obligations and accountability for responses to local needs must be clear. It should provide information, technical support and feedback to national level. It has an important role in maintaining public infrastructure, including information infrastructure at the regional level.

c) Local level functions

For the local level to function effectively a coherent legal framework that legally defines their rights and obligations is necessary. This is especially important in South Africa where local government has been restructured into two levels, district and local municipalities. The practicalities of this "...bearing in mind the costs of running the structures, the subsidiarity principle, the problems that have been experienced with provincial government, and potential competition between structures"(Goldman:2001) have still to be established.

The functions of local level committees is to prioritise local needs, select options and provide the link to higher level institutions (DeWit:N.D.:9-11). "Local level management committees reflecting the existing community social organisation and their leadership form the basis of this activity" (ibid:11) and will form links to either the local authority, or in rural areas the district council. The political desire by central and local governments, social acceptance by stakeholders, technical and economic viability, and sustainability are all principles listed by De Wit (N.D.:6,7) as important in negotiating

future land resource management decisions. I am arguing that these principles are equally applicable to successfully outlining the framework for a SDSS in land use planning at the local authority level.

Local authorities are the level of government closest to communities and are in a position to allow community participation in land management. In the case study both formal recorded settlement and informal unrecorded settlement were involved and problems approving and regulating land uses in the town arose. The problems arose from the refusal of land development applications in the formal areas of the town that did not comply with the existing formal land use development policy, while ignoring, or applying different less onerous development standards, in the informal areas. The problem of integrating the formal and informal communities in a manner that would enable the local authority to administer and regulate land use in the town equitably needed to be addressed. "The failure to adopt, at all levels, appropriate rural and urban land management practices remains a primary cause of inequity and poverty" (Fourie:1998:12, Durand-Lasserve;:997). Local Authorities should therefore adopt different land management approaches and "...find appropriate ways to encourage communities to participate in shared land management of their area" (Davies;1998: 45).

The White Paper on South African Land Policy (1997:77) states that in rural areas "there is a serious need for a new land use planning and a development planning and control system responsive to the needs of people..." and that "coordination of departments and levels of government, and sound working arrangements between national, provincial and local level administrations is fundamental to the success of land policy" (ibid:95). It goes on to say that "a monitoring and evaluation system that can track the progress of land policy measures, and that can provide timeous feedback to managers and the public, is a key element in ensuring that policy measures are able to achieve their intended goals" (ibid). One of the issues that a land policy needs to deal with is "a system of land management which will support sustainable land use patterns and rapid land release for development" (ibid:7). I am arguing that for such a land management system to develop at the local level, the existing traditional 'top-down' regional and local institutions will have to be adapted. At the local level a land management system should; involve local communities in the collection and maintenance of land use information which includes recording the 'de facto' and legal rights to property; be accessible to the communities; encourage accountability and employ participatory methods to establish appropriate land use regulation and development standards.

2.6 Conclusion

I have shown that lower level decision making, decentralisation and the redefining of institutions are crucial if a SDSS, capable of supporting a restructuring land management system to support the rapid release of land for sustainable development, are to be successfully implemented by local authorities. Traditional planning and regulation measures are becoming less efficient and new planning models to improve land use regulation administration and service delivery are required. Neither the formal private land markets or the public authorities can meet the urban land demand of low income groups. Therefore, the informal land market fills the gap and provides access to land without public control or monitoring by public authorities (Durand-Lasserve:1997:4,5). For these reasons the "integration and regularisation of irregular settlements would appear to be the first step towards a new form of managing urban development" (ibid:5). "Empirical studies...underline that there is no integration of irregular settlements without public authority intervention" (ibid:8). I have shown that the processes of decision-making, decentralisation and the roles of institutions have to be adapted if a low-level SDSS capable of providing land use information to allow for faster more efficient economic development and regulation of land and assisting in integrating informal land developments is to be successful. To enable a SDSS to function effectively institutions will have to adapt to allow decentralisation and low level decision-making. In the next chapter I outline existing and proposed legislation which is reforming the present 'top-down' land management approach to

land use approval and regulation. In chapter 4 the framework for a SDSS to provide land use information to support the co-operative governance concept outlined by the new land legislation in South Africa is described.

Chapter 3

PRESENT LEGAL FRAMEWORK FOR DEVELOPING LAND IN RURAL AREAS AND TOWNS IN SOUTH AFRICA

3.1 Introduction

In this chapter legislation at all levels of government relevant to the development of land and how it affects the development and regulation process for different land uses is examined. The legislation is discussed from the perspective of development in the KwaZulu-Natal region where the case study area is situated. It is acknowledged that the list of legislation is by no means complete. The legislation selected gives an indication of the complexities involved in the approval and regulation of land use development in South Africa during this period of land reform. Much of the legislation emphasises community involvement in decision-making. I will show how the importance of land use information to land use approval and regulation procedures is implicit if the recommended land use planning procedures are to function efficiently. For the purpose of this research land use is defined as the different uses of land in both urban and rural areas for the purpose of human settlement and economic activity.

"The apartheid policy of the Nationalist government- as applied to access to land and land tenure- resulted in a vast, legislative labyrinth built upon a massive skein of racial zones which wound amid the corridors of scores of different national and local administrative authorities" (Rutsch & Jenkin:2001:1). The present legal framework for approving and regulating different land uses in South Africa includes new land laws which are being developed to reform the previous labyrinth of laws by their repeal or partial and suspensive repeal. As Rutsch and Jenkin (2001B:22) go on to say;

there exists an extraordinary and complex situation in regard to the laws applicable to land, land use and land development. The Constitution Act 108:1993 also provided that, as at the date the constitution came into operation, all existing laws in force and effect in any area of the country remain in force and effect until repeal or amendment of such laws by the "competent authority" (ibid :section 4:22) The effect of this, coupled with the re-integration of the TBVC¹ states and "homelands" back into the national territory, has been a mixture of national statutes, provincial ordinances, "independent" state and "homeland" laws being applicable in regard to land, land use and land development matters throughout the country.

In this chapter I will show that the legislative framework being developed for land use and land development is in accord with the proposals for participatory and decentralised local governance outlined in chapter 2. For these proposals to function effectively current land use information will be required to support pro-active land use decision-making at the local level. The design and features of a SDSS capable of providing this land use information will be discussed in chapter 4.

3.2 National legislation

"The Constitution Act, 1993 (Act 200 of 1993) and its accompanying Schedules provided that land

¹Transkei, Bophutatswana, Venda, Ciskei

matters and legislative powers regarding land matters are a competence of the national government and the provincial governments have legislative and executive competence regarding a wide variety of land use matters such as agriculture, environment, soil conservation, housing, regional planning and urban and rural development." (Rutsch & Jenkin:2001B:21). The Constitution of the Republic of South Africa (Act 108 of 1996) retains the functional areas of concurrent national and provincial legislative competence in land matters.

In this section the national legislation which affects development approval procedures for different land uses, and the regulation of land uses is examined. It should be noted that the process of land subdivision is included in land development procedures as control of the subdivision of land, and compliance with the conditions of establishment imposed, is a widely used method of controlling and regulating land development.

3.2.1 Development and Facilitation Act (No. 67 of 1995) (DFA)

As stated earlier there is a need to reform the existing complexities of the existing legal environment for land use development and regulation.

...the urgent need for land to be provided and developed far more swiftly than is normally the case using existing legislation has been matched by a concurrent urgent need for legislation which can "fast-track" through technical and complex land procedures without detracting from security of tenure and sound planning (Rutsch & Jenkin:2001B:22).

An example which illustrates the complexity of land use and planning is that "...in the Durban Functional Region, there are no less than 11 separate statutes which immediately come to mind as being applicable to any particular land area in regard to land use and planning - dependent upon just where that piece of land is situate" (Rutsch & Jenkin:2001C:1). The Development and Facilitation Act was an attempt to address this problem by providing nationally applicable norms, standards and procedures to land development.

The general principles of this act apply throughout the country to the actions of both the state and regional and local government but exist in parallel to provincial and other existing laws applicable to land development. It provides broad guidelines for the administration of any spatial zoning, transport or the like by any competent authority dealing with subdivision, use and planning of land. The general principles for land development outlined in the Act include;

- ▶ providing for all urban and rural development including formal and informal
- ▶ discouraging illegal occupation of land with due recognition of any informal development processes
- ▶ promoting efficient integrated land development by optimising existing resources, providing diverse combinations of sustainable land uses, correcting historically distorted spatial patterns of settlement
- ▶ encouraging communities affected by land development to participate in the process
- ▶ developing the capacity of disadvantaged communities
- ▶ policy, administrative practice and law that promotes speedy land development
- ▶ co-ordination of interest of all sectors affected by land development

The Act also provides for the establishment of a Development Planning Committee and Development Tribunals to advise the minister and consider land development applications and conditions of establishment, respectively. Provision is also made for the preparation of Land Development

Objectives (LDO) relating to transport, health, bulk infrastructure, density of settlements, land use and optimum and sustained utilisation of resources. LDO's prevail over any plan defined in section 1 of the Physical Planning Act No. 125 of 1991.

Although this Act came into effect in 1995 it could not be used until the development tribunals were appointed in 1998. Since the establishment of the tribunals it has seen only limited use in development applications. The major drawback in using the Act is that all procedures, problems and hurdles faced by a development application must be addressed before the application is submitted (personal communication from a Land Surveyor). Often the detailed land use information required to motivate the application is not readily available. This involves the applicants incurring high costs without having any prior indication of whether the application has any chance of success. This lack of approval in principle has resulted in many land development practitioners preferring to use the better known Less Formal Township Establishment Act when applying for development approval.

3.2.2 Less Formal Township Establishment Act (No. 113 of 1991) (LFTEA)

This Act was enacted to enable lower servicing standards to be used when establishing residential townships. It provides for . "...shortened procedures for the designation, provision and development of land and the establishment of Townships for less formal forms of residential settlement; to regulate the use of land by tribal communities for communal forms of residential settlement" (Less Formal Township Establishment Act:113 of 1991). It allows the owner of the land to apply for land to be designated for less formal settlement subject to specified conditions. As with the DFA it also confers the right to suspend registered servitudes and other restrictive conditions if required subject to compensation if necessary. Settlement of land is permitted after a general plan has been prepared by a land surveyor. Criteria for the settlement of land under traditional communal tenure are also provided subject to the preparation of a general plan by a land surveyor.

Initially local authorities and developers were reluctant to use the DFA and its new procedures. To encourage its use the Government introduced a system which loads the points awarded to funding applications using the DFA as the route to establish low cost housing developments. As with the DFA there is often a lack of land use information to inform development applications to be made in terms of the LFTEA.

3.2.3 Local Government Transitional Act (No. 209 of 1993) (LGTA)

This Act provided for the interim revision of the structure of local government and established Provincial Committees for this purpose. The Act provided for the establishment of;

- a) forums to negotiate the restructuring of local government,
- b) transitional local government structures,
- c) the Local Government Demarcation Boards,

as well as the appointment and election of transitional local councils in the interim phase of restructuring local government.

The Act also required local authorities to prepare Integrated Development Plans (IDP's) for their areas. Funding assistance for this exercise in the case study area, which is outlined in chapter 5, was provided by the Kwa-Zulu Natal Provincial Administration (KZNPA).

3.2.4 Local Government Municipal Structures Act (No. 117 of 1998)

This Act defines three types of municipalities and a range of slightly different executive systems. The

three types of municipalities are:

- ▶ Type a - urban conurbations of high densities of people
- ▶ Types b and c - the remainder of the country has both a type b or c municipality. The former comprised from the amalgamation of the previous local authorities and the latter being the staff of reconstituted Regional Councils.

The areas of these municipalities were demarcated by the Demarcation Board in terms of the Demarcation Act and supercede existing municipal boundaries.

The process of adjusting the division of functions and powers (including staff, assets and liabilities) between the district and local municipalities has still not been finalised. At present both the local and district municipalities have a capacity problem. This is especially visible at the local level. From my observations and experience at various local authorities in KwaZulu-Natal, the availability of detailed mapping suitable for local authorities and the skills necessary to create land information systems to maintain land management functions and the approval and regulation of land uses are either lacking or not fully utilised.

3.2.5 Local Government Municipal Systems Act (No. 32 of 2000)

The preamble to the Local Government Municipal Systems Act (32 of 2000) recognises that local government under apartheid failed to address the needs of the majority of citizens. The Act outlines the "...core principles, mechanisms and processes....necessary to enable municipalities..." to uplift local communities. The Act provides a legal framework for local government and includes the processes of community participation, planning, performance management, organisational change and resource mobilisation. Local authorities are required to exercise their authority within the "...constitutional system of co-operative government envisaged in section 41 of the constitution" (Local Government Municipal Systems Act (32 of 2000) :section 3). To this end the Act requires local government to;

- ▶ develop common approaches for local government
- ▶ enhance co-operation and sharing of resources
- ▶ find solutions to general local government problems
- ▶ comply with the principles of cooperative and intergovernmental regulations

The Act goes on to state that municipalities should encourage community involvement and that local communities have the right to contribute to the decision-making process. A municipality is also required to develop a culture of participatory governance with local communities (ibid :section 4,5,6, 17). It requires the preparation of Integrated Development Plans, which bind executive actions, to serve as the principal strategic planning tool to guide planning and development. This process is to be completed by June 2002.

I wish to indicate that in Chapter 4 I will outline the framework for a local level SDSS in land use planning. Such a SDSS could provide current land use information and enhance the possibility of local municipalities, which already have capacity problems, achieving the aims of cooperative governance outlined in this Act. If the capacity of local authorities to assemble and maintain land use information to inform decision-making is not developed local governance will be adversely affected by delayed or uninformed decision-making and a reduced ability to implement appropriate land use development and regulation.

3.2.6 Physical Planning Act (No. 125 of 1991) (PPA)

This Act came into operation before the democratic elections of 1994 and the subsequent land reform policies. "The original objective of the Act was twofold – to provide a framework whereby effect can be given to the policy and strategy for rural areas and to promote the orderly physical development of the country in the national, regional and urban context but strictly within the confines of cosmetic 'land reform'..." (Rutsch & Jenkin :2001C:1) as it was envisaged at that time. "Its inherent deficiencies ..." have "...rendered it both inapt and inept as an instrument of land reform" (ibid). An example being the exclusion of the self-governing territories from its provisions in an attempt to maintain the geographical and social divisions between people of the country.

The Act provides an overall physical development planning structure of development regions. Provision is also made for the preparation of national and regional policy plans. These plans were to be prepared by national or regional planning authorities. The legal consequence of these regional plans was that all subservient or lower order plans (sub regional and planning schemes) were only valid if they were consistent with the proposals outlined in them. Section 35(2) of the Municipal Systems Act 2000 (32 of 2000) makes provision for the development framework, prepared as part of integrated development plans, to prevail over the framework defined by the PPA.

The KwaZulu-Natal Provincial Administration (KZNPA) commissioned the preparation of regional and sub-regional plans to be prepared in terms of the flawed Physical Planning Act. These were used as town planning tools to assess the potential for different regions and aid in identifying and providing solutions and policy for regional authorities. The Local Government Transition Act made provision for integrated development plans which had to take cognisance of the superior plans. Unfortunately the storage of much of the information for many of these plans is held by different private and public authorities and little thought has ever been given to maintaining the currency of information collected at considerable expense to government authorities.

From my experience during the current restructuring of local government, I have observed that individuals who previously collected and maintained the land use information required for the smooth functioning of local authority administration and land management have been retired or transferred, and the significance of land use information collected and maintained by them has not been realised. Historically local authorities have proved an invaluable resource for the private sector seeking land use information for planning projects, land use assessments, mapping and contracts. As these functions are increasingly being privatised and no mechanisms to coordinate or maintain the currency of information have been established, land use information is often no longer available from government authorities and is not generally available. If the situation is not addressed the situation could arise where most land use information is privately held and not freely available to the public.

3.2.7 Ingonyama Trust Act (KwaZulu Act 3 of 1993) and the KwaZulu Land Affairs Act (11 of 1992 effective from March 1994)

These two Acts had far reaching effects on the regulation and control of land development in the self governing territory of KwaZulu-Natal. Although these Acts apply only in KwaZulu-Natal they were only made possible by agreement and amendments made at a national level. For this reason they are discussed under national legislation.

The Ingonyama Trust Act "...transferred all land, together with all real rights therein which the KwaZulu Government held within:

a) the proclaimed area of the jurisdiction of the KwaZulu Legislative Assembly (i.e. the proclaimed

areas as contained within Proc. R.70 of 1972 as amended);

b) the land acquired by KwaZulu in terms of Proclamation R. 232 of 1986 (SA G.G.10560 of 24 December 1986);

c) the land acquired by KwaZulu in terms of Proc 28 of 1992.....

in trust to the Ingonyama as the sole trustee of the Ingomyama Trust 'for and on behalf of the tribes and communities' contained in the Schedule to the Act. In extent these land areas form over 90% of the former territory of KwaZulu" (Rutsch & Jenkin:2001A:17).

The KwaZulu Land Affairs Act (KLA) "...was a legislative consolidation exercise which repealed the whole of the Black Land Act of 1913 and the Development Trust and Land Act, 1936 with the exception of those sections the repeal of which would affect the control the KwaZulu Government had over the land" (ibid:17). The Minister of the Interior was responsible for the administration of this Act which effectively provided a second land control and development administration for land within the boundaries of the previous KwaZulu homeland (ibid 18). In 1994 the implementation of these two Acts was "...dependent upon their assignment by the President to a 'competent authority'"(ibid :19). The Acts were not assigned to any competent authority for many years and although they remained in force over land in the former KwaZulu no provincial authority could administer them (ibid:20). The Ingonyama Trust Act was eventually amended by National Act 9 of 1997 which established the Ingonyama Trust Board to administer the responsibilities of the Trust. This Act also excised all established towns from control of the Act. In 1998 the Minister of Agriculture and Land Affairs assigned the administration of a highly amended KwaZulu Land Affairs Act to the KwaZulu-Natal Premier (ibid:22).

These Acts were not consistent with land reform laws and their future is uncertain due to their deficiencies. Rutsch & Jenkin (ibid:21) are of the opinion that "...both these Acts should have been repealed on the basis that neither were compatible with the spirit or end purpose of current 'land reform' and both indubitably caused endless confusion and delay to development in the areas where they were allegedly applicable." However the later cosmetic amendments made to these Acts have allowed for their continued existence.

As can be seen from the Acts outlined above, the administration and regulation of land use and development in the former homeland of KwaZulu is difficult and fragmented among a multitude of agencies. The current reform of local government has in many cases resulted in a loss of the land use information that did exist in towns previously administered by regional agencies. A SDSS, incorporating the concepts outlined in chapter 4, established in these towns, which are generally populated by the very poor, could become a valuable land management tool that could empower and inform the local communities provided they are involved in creating and maintaining them.

3.2.8 National Building Regulations and Standards Act (103 of 1997)

This Act provides the legislative authority for the compulsory adoption of uniform national building regulations by local authorities. The reason the act is mentioned is because the regulations are functional in that they provide a degree of flexibility to owners and designers. The regulations are not clear cut and are only prescriptive regarding the strength and stability of buildings. Similarly, any future regulations governing protocols and methods required of local authorities implementing land information systems should be functional and normative. In other words regulations stipulating the necessary standards, reference frameworks and software used must only be prescriptive in ensuring the free flow of information between systems and authorities.

The application of building regulations are increasingly being applied by outside agencies on behalf of local authorities. This results in local authorities not maintaining land use maps that show the

positions of formal buildings being approved. The spatial position of buildings formal and informal are important features of land use information when routes for new infrastructure such as roads, water, sewers and electricity are planned.

3.2.9 The White Paper on Spatial Planning and Land Use Management (2001)

The white paper is an attempt to "...rationalise the existing plethora of planning laws into one national system..." (White Paper on Spatial Planning and Land Use Management:2001 :61). It is based on the Green Paper for Development and Planning and builds onto the concept of the integrated development plans required by the Municipal Systems Act, 23 of 2000. "The intended outcome of the white paper is a new national law, the land use bill." to "...replace inter alia the Physical Planning Acts and the Development and Facilitation Act" (ibid:66).

According to the White Paper (ibid:67) features of the land development patterns of today, skewed by colonialism and apartheid master planning of the past, are listed as;

- ▶ large dormitory areas far from places of economic, cultural, recreational and educational opportunity;
- ▶ severely overcrowded former homelands, forced to depend on limited agricultural land, in turn leading to severe environmental degradation;
- ▶ substantial inequality between the areas set aside under apartheid for white and black residential occupation; and
- ▶ wide disparities in the provision of infrastructure and services.

The principal land use planning and management problems of the different spheres of government highlighted in the White Paper are (ibid:67,68);

- ▶ Different regulatory systems, inherited from the past, for managing land use.
- ▶ IDPs (in terms of the Local Government Transition Act) and LDOs (in terms of the DFA) have had a limited impact on spatial patterns. Rights to develop land have and are controlled by past legislation and existing plans such as town planning schemes which have remained in place largely unchanged.
- ▶ Lengthy delays
- ▶ The emphasis on controlling rather than facilitating and promoting development.
- ▶ Inappropriate controls for illegal and unsafe development as well as a lack of capacity at municipal level to enforce these controls.
- ▶ Fear of paying compensation for existing historical rights.
- ▶ Overlap of permissions for land development from different authorities

The White Paper further outlines principles and norms "...to direct and steer land development, planning and decision-making in all spheres of government.." (ibid 70) and to achieve planning outcomes that:

Restructure spatially inefficient settlements; promote the sustainable use of the land resources in the country; channel resources to areas of greatest need and development potential, thereby redressing the inequitable historical treatment of marginalized areas; take into account the fiscal, institutional and administrative capacities of role players, the needs of communities and the environment; stimulate economic development opportunities in rural and urban areas; and support an equitable protection of rights to and in land (ibid).

The White Paper includes the following activities as functions of land use management. The regulation of land use changes, 'green fields' development, subdivision and consolidation of land parcels, the regularization and upgrading of informal settlements and the facilitation of the development of land through municipal participation (ibid:77).

The concept of the new role for local government in relation to spatial planning, land use management and land development is the facilitation of appropriate development as well as continuing with its regulation and control. Spatial development frameworks are proposed as indicative plans to guide and inform local decisions about the planning, development and use of land (ibid:79,80). It is proposed that "the current plethora of different procedures, in terms of different laws, will be replaced in the new legislation with a single procedure, providing for thorough, yet speedy, consideration of applications as well as meaningful involvement of the public in those decisions" (ibid: 83). The paper proposes that the most direct role in spatial planning and land use management will be played by local government. It will be the responsibility of local government to take the required decisions on the land development applications made in their areas.

To inform decision making at this level I am arguing that a SDSS at the local level, administered by the local authority, to support land use planning is essential if the role for local government envisaged in the White Paper, is to be carried out effectively. If the ongoing expense of collecting de facto land use information (the mirror principle) to inform and update all aspects of spatial development frameworks, and provide the information necessary to compile briefs for the private sector is to be avoided, a framework to enable SDSS to maintain a current record of both authorised and unauthorised land uses is vital.

3.2.10 The White Paper on South African Land Policy

The guidelines and principles provided by the Reconstruction and Development Program (RDP) guided the early processes of the land reform programme and policy (White Paper on South African Land Policy:1997:1). Land is a finite resource and the South African Land Policy (ibid:7) lists the following issues that land policy needs to effectively deal with:

- ▶ the injustices of racially based land dispossession of the past;
- ▶ the need for a more equitable distribution of land ownership;
- ▶ the need for land reform to reduce poverty and contribute to economic growth;
- ▶ security of tenure for all; and
- ▶ a system of land management which will support sustainable land use patterns and rapid land release for development.

It goes on to state that "land policy should ensure accessible means of recording and registering rights in property, establish broad norms and guidelines for land use planning, effectively manage public land and develop a responsive, client friendly land administration service"(ibid). The decentralisation of functions to a local government level is seen as the long term vision. The local level is seen as the level where delivery can take place most effectively. To provide this decentralised delivery will require the development of local-level land administration. An element of this is the idea of a land office, staffed by land officers, and located within local government (ibid:101). I argue that this vision for decentralised delivery and local level land administration should be extended to include a SDSS. The importance of low level decision-making and decentralisation to the design of such a SDSS framework was discussed in chapter 2.

A recurring problem recognised in the land reform of other countries is the inadequacy of survey and land tenure records as well as "...a lack of information on what exists on the ground and how land

is utilised”(ibid:106). A National Land Information System (NLIS) is being established to coordinate land information, establish standards and provide available land information to government agencies and the public (ibid:108). Land information is recognised as an asset and needs to be protected by copyright and should where possible be paid for by the users (ibid).

In South Africa there is at present no system that maintains a record of current land uses at the detailed scale required by local authorities. Information is spread across a number of local authorities and utilities as it relates to functions relevant to their particular purpose. A record of land uses as a record of what is happening on the ground is generally not available, or if available, is out of date as it was collected to inform the once off formulation of planning policies or some specialised type of land development and not updated. By developing a SDSS in land use planning, distributed data bases of current land use information maintained by different local and district authorities could become available to land management practitioners. To ensure that information in these distributed data bases can be exchanged between local and district level municipalities activities should be coordinated at the district level. The district level could provide the link to other levels of government and the NLIS.

3.2.11 Draft Land Use Management Bill (20 July 2001)

The bill proposes a general principle that spatial planning, land use management and land development must be based on sustainability, equality, efficiency, integration and fair and good governance. The last component states that the “capacities of affected communities should be enhanced to enable them to comprehend and participate meaningfully in spatial planning, land use management and land development processes affecting them” (Draft Land Use Management Bill:2001:16). If communities are to participate in spatial planning and land use management and development processes local authorities will have to provide the relevant land use information.

The bill provides for a national land use framework and stipulates details that must be included in the spatial development framework component of a municipality’s integrated development plan required in terms of the Municipal Systems Act. Municipalities are, within five years of the enactment of the Act, required to adopt a land use scheme for the whole of their areas. Any land use scheme will supersede any town planning scheme within which it applies.

The composition and conduct of land use regulators comprising metropolitan local or district municipalities and provincial land use or appeal tribunals charged with approving land use changes in their areas of jurisdiction are stipulated in the bill. The Development Facilitation Act, Physical Planning Act, Less Formal Township Establishment Act and the Removal of Restrictions Act will be repealed when this bill is gazetted (ibid:18,19, 20,23,30,31, 34 & 52). If these tribunals are to function effectively and the once off collection of land use data to inform them is to be avoided, a system to record and maintain land use information is a priority. For participatory local government to be successful a SDSS capable of recording, analysing and presenting land use information and the communities views is required.

3.3 Provincial legislation

The provincial planning legislation applicable to other regions of South Africa have no relevance in KwaZulu-Natal or to this dissertation and are not discussed.

3.3.1 Natal Town Planning Ordinance (27 of 1949)

This Ordinance consolidated and amended the law relating to subdivision, township layouts and

changes of land use which must be directed through either the Town and Regional Planning Commission or the Private Townships Board. Only development applications in the cities of Durban and Pietermaritzburg are exempted from this procedure. The ordinance established also provides for the preparation and maintenance of town planning schemes and is still widely used by local and provincial authorities. It stipulates penalties for contraventions of the Ordinance and conditions of establishment.

From my experience in development planning the pressures of urbanisation, informal settlement and changing economic circumstances have overtaken the traditional town planning scheme. Wai-Chung Lai (1998:249) in his examination of a leasehold land system for allocating property rights points out that theorists argue that "...statutory planning... is a matter of necessary government intervention in a modern society." He argues that "...planning legislation is, by nature, negative. It may regulate, stop or restrict but can never compel development" (ibid 250).

He goes on to state that the provision of certainty in terms of a statutory zoning plan (town planning scheme) should not be confused with inflexibility (ibid:255). "The real inflexibility lies in the fact that it takes a very formal and lengthy administrative as well as legislative procedure to produce or amend a statutory plan" (ibid). In my experience this rigidity of town planning schemes and exclusion zoning precludes town planning schemes from guiding development. Statutory planning can only catch up with 'de facto' development after the urbanisation process of developing areas has matured. Town planning schemes serve to regulate development and are a development control device rather than a forward planning one (ibid 263). The inflexibility of town planning schemes is exacerbated by the fact that there are no systems dedicated to collecting and maintaining land use information. This results in a continual need for comprehensive land use surveys having to be conducted to assemble current land use information. This information is needed to identify land use trends and provide a measure of the performance of the scheme, inform any proposed town planning scheme revisions, zoning changes, land use development approvals or highlight land use regulation problems. I will show in the case study in chapter 5 that such land use surveys are relevant to both formal and informal development where there is a lack of detailed current spatially related land use information.

3.3.2 KwaZulu- Natal Planning and Development Act (No. 5 of 1998) (PDA)

This Act was gazetted on 29 July 1998 but cannot be used as the regulations necessary for its application are still being promulgated. The Act is an attempt by Regional Government to rationalise and consolidate laws on development planning within KZN. It provides for the dissolution of the Town And Regional Planning Commission and the Private Townships Board which were created by the Natal Town Planning Ordinance (27 of 1949). These bodies are to be replaced with a Planning and Development Commission which will also constitute the commission for the Province provided for by section 11 of the DFA. Provision is also made for a Planning and Development Appeal Tribunal with the power to decide appeals in terms of this Act and the DFA. Appeals under the DFA are to be heard under the regulations that apply to that Act to the extent prescribed by the Minister (MEC). The procedure and responsibility for preparing development plans in the region, as well as the conversion of existing plans or schemes is provided for.

Schedule 1 of the Planning and Development Act (PDA) states that planning is to be directed to strategic management which involves "...making future provision for the orderly and rational use of land and other physical resources through facilitative processes, and securing that provision by regulating and promoting changes in their use. According to schedule 1 planning is seen as an interactive process with communities that must;

- allow appropriate public participation

- ▶ be dynamic and flexible to accommodate changing needs
- ▶ empower both communities and individuals to order themselves

I argue that the Act pays lip-service to flexibility as the procedures required to amend development plans will be as restrictive as the amendment of town planning schemes under the previous Town Planning Ordinance. It appears that this Act has been overtaken by events and it seems likely that the Act will be withdrawn before the regulations required to implement the Act are finalised.

3.4 Local authority regulations or bylaws

At the local government level, the services typically provided by local and district municipalities include, land survey, engineering, planning, building inspection, valuations, financial and administrative services. Local regulations or bylaws are used to regulate these activities within the legal framework of national and regional legislation.

In the absence of bylaws and town planning schemes, conditions of title and the regulations applicable in superior legislation are applied. In cases where the regulations of superior legislation are in conflict with local regulations the more onerous apply. This means that municipalities have some discretion in regulating development and economic activity provided it complies with the spirit and minimum standards stipulated by superior legislation.

In KZN, outside the cities of Durban and Pietermaritzburg, all land development applications are first commented on by the existing local authority before being sent to regional government for its approval. This approval is legally provided for in terms of the Town Planning Ordinance, Less Formal Township Establishment Act, Development Facilitation Act, or KwaZulu Land Affairs Act. The drawback of this procedure is that it is lengthy and removes local accountability from local decision makers. It also means that the final decision for approval of development applications is made by authorities ignorant of local conditions and totally dependent on the local authorities to present the ground reality. This reality is based on information which, in many instances, does not reflect the true situation on ground as it is usually both sparse and outdated. Activities which, whether socially acceptable or not, are not or cannot be accommodated by a town planning scheme are either prevented from taking place or take place illegally.

In my experience many small home businesses accepted by the neighbourhood in which they are located fall into this category. In more formal areas examples of these include bed and breakfast establishments and home businesses. In the informal poorer areas, where the poverty of the residents is a force for a variety of survival land use activities not accommodated by a town planning scheme, many activities are carried on in either ignorance, or defiance born out of necessity, of land development law.

3.5 Conclusion

I have shown that the thrust of the body of new and proposed land development legislation is to encourage cooperative governance. Local authorities are being encouraged to develop the means to permit the use of community participation in land management and regulation. If this culture of participatory governance is to be developed communities should be more involved in the decision-making process. The Draft White Paper on Spatial Planning and Land Use Management outlines a new role for local government in relation to land use planning and land management. The concept outlined is for the facilitation of appropriate development as well as its regulation and control.

The South African Land Policy envisages the decentralisation of land management to the local level

where delivery can be most effective. The availability of land use information is implicit if local authorities are to have a realistic chance of implementing the principles of participatory governance and decentralised local delivery. To inform this level of decision-making for the approval and regulation of land uses local authorities need to be able to provide the necessary land use information as well as the expertise necessary to ensure compliance with other legislation controlling land development. In the following chapter I outline the framework for SDSS in land use planning designed to fulfil this need.

Chapter 4

A FRAMEWORK TO PROVIDE LAND USE INFORMATION FOR SPATIAL DECISION SUPPORT SYSTEMS IN LAND USE PLANNING

4.1 Introduction

In this chapter I will present an overview of LIS in order to develop a framework for spatial decision support systems (SDSS) in land use planning. The functions it should support as well as features of different approaches which could be adopted when implementing such a SDSS are then discussed. The concepts of the spatial location of data, visualisation, the use of metadata and maintaining the currency of land use information at the local level are then examined.

A SDSS that involves communities in assembling and maintaining data to support land use decision making and regulation could be a valuable land management tool to improve the land management capabilities of local authorities. As has been shown in chapter 2 land use planning, accountable decision-making, levels of decentralisation and the support of public authority land management institutions play an important role in the approval and regulation of the development of land and its resources. Land development decisions, traditionally made by the upper levels of management, have become increasingly ineffective in approving and regulating land use. New land legislation, which is providing the framework for a different approach to land use planning and the approval and regulation of land use during this period of local government reform in South Africa, was outlined in chapter 3. This land legislation supports a degree of decentralisation and local level land use decision-making. For this legislation to be effective and efficient land use information about existing land uses to inform the land use development approval and regulation is a prerequisite. As this detailed land use information, necessary to support land use development and land regulation is not generally available, I will show that decision makers could be informed by implementing a local level framework for SDSS. This SDSS should be designed to assemble, maintain, analyse and present land use information in whatever form is required.

As I have shown in chapter 2 this implementation will be most effective if there is political support to amend the present land management system by adapting institutions to allow decentralisation of authority and decision-making to lower levels. The involvement of communities in the assembly and maintenance of information could serve to both inform and educate them about land management. In my experience if land use information is not available or current, the approval process becomes an ad hoc one which is exposed to manipulation by powerful interest groups.

A conceptual model is defined by Latu (N.D.:27) “...as the abstract representation of the users’ mental view of reality. It mirrors the way in which users describe the real world phenomena and their interaction. A LIS designer must understand and be able to conceptualise the relationship and interaction between the objects, processes, data, information and users before designing an information system.” As local customs, even within a single small town vary, the framework should be able to outline the views of all the stakeholders. Land uses on the ground should be mirrored to provide the information necessary for better land management.

Existing concepts and procedures will have to be adapted if SDSS in land use planning is to function effectively. These adaptations will only be effective if they are accepted by the people the SDSS is designed to serve. It is often forgotten that when traditional or existing informal systems are adapted ‘...a law will work only if the people accept it’ (Olewale quoted in Latu:N.D:32). I argue that this is also true of the adaption of existing institutions and procedures if a SDSS is to function effectively.

If communities are involved in outlining the framework for SDSS that assembles and maintains land use information it will be more likely to be accepted. It is also important to remember that when outlining such a SDSS framework “simple and effective models are essential for selling the concept to politicians who need to justify the expense of LIS in the face of increasing pressure from the public for cost-effective government and administration” (Latu: N.D.:28).

UNCHS (1990:51) argue that existing cadastres should be maintained and must integrate the management of land in economic, environmental, and land-information management terms. The institutional and legal framework for decentralisation should be guided by national policy. “Greater decentralization can overcome obstacles to action arising from the political preoccupations of central government and weak political will at the national level” (UNCHS:1996:294). Procedures sensitive to local conditions and open to public scrutiny can ensure greater accountability and transparency (ibid). Perfect solutions for improving land management and land information management are not possible but optimisation of the process within existing constraints is (UNCHS (1990:51). A framework for a local level SDSS which provides for the collection and maintenance of land use information to improve land management could be a part of the search for this solution provided provision is made for the necessary vertical linkages to regional and central government. Such a framework could be the first step or level in the process of outlining how to collect and maintain detailed land use information which could, once accuracy levels are acceptable, be integrated into existing cadastres to inform national or regional policy. The system should be flexible, easy to use and could have both digital and manual aspects depending on the skills available.

4.2. Definition of SDSS framework for land use information

Land information systems (LIS), geographical information systems (GIS), automated mapping/facility management (AM/FM) are all terms developed to describe information systems which have some description of land to provide a reference base for land information. The objective of all is to provide “...a reference base as a resource for land and land related information” (Latu:N.D:14). LIS are information systems which provide “...strategic and operational tools for the management of land in urban areas” and may be distinguished from “GIS which generally provide land-related information on much larger areas, such as water catchment areas and soil zones...” (GTZ:1996:12). Maguire points out that the emphasis of decision support systems “...is on manipulation, analysis and, particularly, modelling...” of information to support decision makers (Maguire:1991:10). In other words SDSS provide the spatial component for the presentation, analysis and modelling of land related information.

A general definition of LIS adopted by the International Federation of Surveyors in 1981 is that it is ‘...a tool for legal, administrative and economic decision making and an aid for planning and development which consists on the one hand of a database containing spatially referenced land related data for a defined area, and on the other hand, of procedures and techniques for the systematic collection, updating, processing and distribution of data...’ (Latu:N.D.:15). This is a general definition for spatial information systems and as observed by Latu (ibid:15,16) this definition limits LIS to areas where land is mapped into parcels with unique identification numbers which become the reference for data contained within the parcel

For land use planning, the whereabouts of the land, its rights and information about the actual use of that land and whether it has been subdivided or not, is what is needed. Different land uses are not always parcel based, particularly in informal settlements, and an effective SDSS framework to accommodate all land use types whether or not they are parcel based, authorised or unauthorised is required. “If the objective of developing a LIS is to provide a platform for the sharing of land information in a multi-user environment, then the development of a LIS should be directed towards

making the information available, in a processable format whenever needed, for management purposes” (Latu:N.D:2). Latu goes on to say that a LIS should be integrated to allow the combining of “...data from different sources which were captured by different methods at varying accuracies and resolutions and stored in different formats using diverse referencing mechanisms” (ibid:25). The major purpose of a land information management system (LIM) described by Fourie (1998:3) is that it should assist decision makers and rather than focus on technical issues should attempt to increase the “...capacity to collect, interpret and apply information, to establish trends for better decision making.” This view is similar to that of Yee Leung (1997:5,6) who says that the emphasis on software engineering and integrating data base models rather than knowledge engineering is wrong. LIM should in other words be directed at the effective use of information to achieve an objective or set of objectives (Dale and McLaughlin:1988:14).

A framework for SDSS in land use planning should be capable of including both parcel numbers and points, lines or polygons as identifiers to spatially locate information and its attributes in a policy environment that permits freedom of information. The framework must accommodate distributed land use information data bases maintained at the lowest level by both formal and informal communities. These communities should be supported by a local authority that has links to other local and regional authorities. This would increase the processing power of existing SDSS in land use planning which could be adapted over time to expand the role of existing cadastres and other central land information systems.

If the full value of small linked distributed land use information data bases are to be realised by public authorities in land management an open attitude to the provision and exchange of information becomes essential. As stated by van Gysen (1995:16) “the concept that public information should be made public, widely distributed, easily accessed, cheaply provided, is still foreign to us (in contrast to US Canada, Australia). In consequence there is at present much duplication of effort, as people go away and do it all themselves.” Van Gysen was referring to the access and distribution of data from the National LIS of South Africa. This statement could also be applied to the access and distribution of land use information which is scarce. Van Gysen does not see this duplication as necessarily “...a bad thing - the move is away from big centralised projects, to a multiplicity of small, linked LIS systems- provided it is accompanied by an open attitude to the provision and exchange of data via ‘the network’ (or the coming information superhighway)” (ibid 16).

4.3 The functions of a framework for SDSS in land use planning

The purpose of a framework for a local level SDSS should initially be limited and directed to the specific purpose of collecting and maintaining the land use information required to support local level decision making. To achieve this the land use information assembled for SDSS must be capable of informing the following eight functions;

- ▶ identifying resources and constraints (UNCHS:1990:61) This information will inform discussions of development proposals and options.
- ▶ identifying owners to facilitate administration - this includes the levy of taxes and service charges (GTZ:1996:18).
- ▶ providing spatial information about the actual use of land to improve planning capacity (ibid:19).
- ▶ integrating informal and formal communities - the process of providing demographic information to speed up process of registration and tenure (ibid:18) could serve to inform different communities of the specific difficulties and values of each.
- ▶ managing infrastructure - providing information of utility networks to inform and co-ordinate development and investment decisions (ibid:19).

- ▶ accommodating different information sources of various accuracies (Fourie:1998:7)
- ▶ integrating local knowledge (Fourie:1998,Pieri:1997).
- ▶ producing management information for local management bodies (Fourie:1998).

4.4 Approaches for implementing a framework for SDSS

Implementing an integrated land use information management framework to inform a SDSS raises questions about different approaches to its implementation. Five dichotomic features outlined by GTZ (1996:36,37) when implementing LIS in developing countries could provide guidance for determining the approaches that could be adopted in implementing such a framework. These features include, a piecemeal approach or comprehensive reform, pilot project or national scheme, localised or centralized system, dedicated or multipurpose system, and manual or computerised data processing.

4.4.1 A piecemeal approach or comprehensive reform

"A pragmatic, piecemeal approach is preferred ..." (ibid:36) where the resources available for systems development are limited. Such an approach "...still needs a legal framework to support its existence" (ibid). As resources for developing information systems are limited in developing countries and "the awareness of the role of information in general decision making is very low in Africa" (Ezigbalike:1996B:349) an incremental piecemeal approach would seem to be the best approach to implementing new land use information management strategies to support a land use information framework for SDSS.

4.4.2 Pilot or national scheme

"Given a shortage of resources and the complexity of issues to be addressed, the pilot project approach seems to be more realistic and feasible than a nationwide approach" (GTZ:1996:37) when implementing LIS. I am arguing that this statement is also true for implementing a low level framework for SDSS at the local authority level. At this level a pilot project with clearly defined land use information objectives would seem the most appropriate approach to develop and adapt the institutions and linkages necessary to implement it.

4.4.3 Localised or centralised

A focus of a framework for SDSS is on collecting, maintaining and supplying land information to support decision makers and improve the speed of land development approvals. "Since most land information originates locally, and the majority of prospective users in both the public and private sectors are also local, a localised land information system would seem most appropriate for ensuring efficient land management and a more prominent role for local government in urban management" (ibid:).

4.4.4 Dedicated or multipurpose

"While LIS is usually associated with multifarious uses of data, the experiences of almost all cases show that a focus on only one or a few priority tasks can considerably facilitate the operation of an LIS in its initial stages. ...The successful improvement of a few essential tasks can be a much greater incentive to develop and integrate new uses than the acquisition of sophisticated equipment with intensive external assistance" (ibid). A framework for SDSS should be limited to supporting land use planning and at the same time improving cost recovery strategies. This strategy could show its immediate economic worth to decision-makers thereby justifying its cost and encouraging the

possibility of funding for future expansion.

4.4.5 Manual or computerised data processing

Although manual data processing is considered largely obsolete examples of good LIS show that "manual and digital data processing can coexist, provided that common references have been established to link the different data sets" (ibid). In developing countries levels of education and the availability of technology is often limited. For these reasons a framework for SDSS in land use planning should address the use of manual or a combination of both manual and digital technology for data processing where local authorities have the necessary infrastructure and necessary technical expertise.

In South Africa where local authorities are undergoing a restructuring process, an approach that combines elements of all the above approaches would seem to be the most practical way of implementing a land use planning framework for SDSS. A localised, piecemeal approach to implementing the framework, dedicated to supporting land use planning and cost recovery, could be implemented as a pilot scheme at selected local authorities. Such an approach will allow the framework to be adapted to the present ongoing restructuring of the existing land information management strategies. Provided the manual and digital data are linked with common references there is no reason why both data types cannot coexist. A review of the technology and skills levels available to the local authority would be the deciding factor for determining the level at which assembling land use information for SDSS, could be computerised. The adoption of the above approach will allow SDSS in land use planning to adapt to the new legislation affecting land use approval and regulation and the trend towards cooperative participatory governance which was discussed in chapter 3.

By adapting and utilising existing structures in local authorities and existing or new community bodies to collect and update information, incremental approaches to improving spatial information systems for land use planning will be possible. A framework for SDSS should include the structure of land use information data bases to inform the eight functions listed above. These are all critical functions if the system is to support land use planning decision-making effectively. To accommodate the priorities of demand driven land use information to support land management, different ways of managing the concepts of location, visualisation, metadata, (custodianship) and currency are required. These issues are reviewed below from the context of a local authority formulating a framework for SDSS in land use planning.

4.5 Locational concept

The use of the parcel-base reference system used under freehold tenure systems is seen by Latu (N.D.:25) as inappropriate for resource management in countries with dual land tenure systems. "Social scientists, physical planners and environmentalists are interested more in the information about land per se and the improvements made to it than the subdivision of the land into parcels." (ibid:25,26) "...Less than 1% of sub-Saharan Africa is presently covered by cadastral record, and 90 % of land parcels are undocumented in developing countries" (Fourie:1998:6, UNCHS:1990). These figures illustrate the reality for developing countries. Latu (N.D.:26) argues that "using the location, as depicted on the topographic map base by a point, as the basic unit of data collection and communication, is one of the possible solutions to handling information about land held under customary tenure systems." As cadastral information in developing countries is so uneven data assembly should not be restricted by existing cadastral systems and parcel numbers.

Data reference frameworks should be able to accommodate 3 types of spatial relationships. These

are firstly pictorial (generalised/symbolised) data, secondly geometric (measurement based) data and thirdly topographical (spatial relationships between features) data (Fourie:1998:18, Dale and McLaughlin:1988:10). In the absence of cadastral information this could be provided by digitising points to serve as a common locational referencing mechanism. "Every geographic feature has a fixed location (spatial characteristic) on the Earth's surface and together with its aspatial characteristics (name, quality, extent etc.) the feature becomes meaningful and distinguishable from other features,..." (Latu;N.D:22,23). All attribute and textual information about the land could be attached to these digitised points (ibid:24-26). For SDSS to fulfil its function whatever locational system is used must be replicable, flexible and capable of expansion. For this to occur a national, regional and local framework is essential.

4.6 Visualisation

The reference frameworks for cadastral and LIM systems have generally been measurement based. A graphical or pictorial reference framework and information output should make it possible for decision makers to visualize the spatial information and make informed decisions. Decision makers should be able to see (visualize) what exists on the ground, so that they could make better more appropriate decisions. ...The graphical (pictorial)framework consisting of small scale base maps, created through cartographic generalization, should be based on features which aid the visualization of decision makers... (Fourie:1998:19).

The importance of both small and large scale maps using cartographic generalisation based on distinctive and known features and /or existing aerial photographs or cheap video images are important to aid the visualisation of actual land uses at a general level. These methods can provide cheap fast low cost mapping in areas where there is none. If greater accuracy is required the position of buildings and local landmarks can be linked to the coordinate system using a global positioning system (GPS) (UNCHS:N.D.:1). The use of a pictorial reference framework to create a generalised map showing land uses spatially related to local features, service, roads, schools, railway lines, and local land marks was a valuable land management tool used in the case study for communities to indicate areas preferred for different uses. Socio-economic data of informal or communally owned settlement can be spatially related to individual houses or other prominent local features which are geo coded (Fourie:1998, Davies:1998). Details of how the informal settlement structures in the case study were located spatially on the available mapping of the area is outlined in the following chapter.

Planners need to adapt the 'top-down' approach to land use planning decisions "...because this type of approach is not supplying land use sustainability" (Fourie:1998:24). Initial broad land use planning policy decisions for specific areas could be based on the overall view supplied by base maps. Within this overall framework the level of detail necessary for altering land use could then be obtained from "the local consultation exercise..." (ibid). Local authorities are ideally placed to carry out this role. This role has not been a priority of local authorities and unless existing procedures are adapted, or if necessary new ones established, to assemble and maintain the necessary land use information it will not be available. If land use information is available, it has usually not been updated and its value is questionable for anything other than historical purposes.

4.7 Sharing of land use information and metadata bases

"Most operational applications of GIS are in some measure dependent upon the availability of data collected by government agencies" (Masser:1998:1). To facilitate the availability or sharing of this data a national strategy, which Masser terms a Geographic Information Strategy, is needed to describe the technology, policies, standards and human resources necessary to acquire, process,

store, distribute and improve utilization of geographic information@ (ibid:4). Three key elements for the development of geographic information strategies are listed. These are firstly, the need for overall coordination, secondly, the significance of metadata services and thirdly, the strategic importance of the limited number of core databases (ibid:9).

As government information assets are distributed across a range of government departments and the economic significance of geo-information is in its referencing framework, which provides for the integration of different data sets from different areas, two levels of government activity are seen as crucial. These are firstly, coordination, to enable the sharing and exchangeability of information, and secondly, metadata services, which provide information about the information available on databases (ibid:10,17).

The problem of sharing information is also recognised by Pieri (1997:227) who says that;

while considerable effort is currently made.... to collect information and data, the lack of coordination between information collectors and suppliers (national institutions, ministries, NGOs, bilateral and international aid organizations) has a high cost and does not lead to efficient use of these data and information. Decentralised systems of data collection are ... best but they should be systematically interconnected within some common network to improve opportunities to share.

This theme is developed further by Fourie (1998:24) who states that "present approaches (Pieri:1997; Hurni:1997; Kutter et al:1997) emphasise the need to link the central and local levels more closely on the one hand, and decentralize decision making and information on the other." Consistent standards and formats increase the value of collected data as they "...will allow temporal and spatial trends to be documented and explored" (Pieri:1997:227).

As information has value, private organisations are reluctant to share their information and such a role will inevitably have to be provided by the public sector. The use of private companies to collect information on behalf of the state must be carefully administered. This is especially relevant during this period of restructuring local government. If strict procedural and administrative control is not applied, a situation in which a limited number of suppliers develop a monopoly could arise. This would be expensive and detrimental to both local government and a policy of freedom of information that is necessary if demand driven assembling of land use information for SDSS are to be developed.

The existence of metadata bases, at local, regional and national levels which could provide details of the format, currency and type of information available, would add value to any existing distributed SDSS data bases at the local authority level. The metadata base of the NLIS could then be accessed by local authorities and requested to supply any available basic information to assist in establishing a framework to assemble land use information at the local level. The decentralised collection of large scale land use information could then be done by the different local authorities responsible for these distributed local level databases designed to assemble detailed land use information within their areas of jurisdiction. If metadata bases and linkages with higher levels of government are defined by the local authority level framework for SDSS, the basis of a sub-system able to provide large scale land use information could be established. Once the information is assessed for currency and accuracy, It could be aggregated to meet the needs of higher level authorities. If as suggested by Fourie (1998:6,7), cadastral systems become a sub-system of a LIM system the difficulties of "high accuracy and legal evidence requirements, reliant on measurement based approaches and professionals skills " (ibid:7), can be avoided. If SDSS in land use planning are to have a role as a sub-system for land use information, the framework outlining the support of the assembly and

maintenance of land use information must ensure that the co-ordination of standards to enable sharing information listed in metadata bases is a carefully monitored aspect of land policy. This is necessary to ensure that value can be added to the information systems of other tiers of government by providing current land use information.

The third key element for formulating the Geographic Information Strategy mentioned by Masser is the strategic importance of a limited number of core databases. It is envisaged that SDSS could form a component of a future core land use information database but it is acknowledged that further research is required if the strategy of a limited number of core government databases is to be effective.

4.8 Data currency

Maintaining the currency of land use data raises the issue of custodianship. Responsibility for information should be placed as close to the originators of the information as possible (Masser:1998:17). Local authorities are the level of government closest to the community of land users from which land use information originates. For this reason they are the best placed level of authority to implement a local level framework to provide land use information for SDSS. As the local authority will incur costs in administering such SDSS the role of custodianship highlights the importance of defining rights of access, integrity and security, storage as well as the currency of land use data (ibid). The ownership of land use data must therefore be distinguished from access to it.

Once information has been assembled by a local authority the existing formal administrative systems must be adapted to maintain the currency of the land use information. Once off initial land use surveys should be conducted by municipal staff to establish existing land use information. As shown in the case study outlined in the following chapter, building and health inspectors, valuers, survey and planning staff are all local authority staff that could be used, together with members from the local community, to assist with land use surveys. Once the initial land use survey is complete the currency of the land use information assembled can be updated by recording the location of both land development and building plan approvals. Periodic land use surveys of neighbourhoods could be conducted to confirm that de facto land uses accord with the approved land uses. Existing cadastral information of both rural and urban areas is available to local municipalities from the Surveyor General through the district municipalities. This information would form the basis for recording infrastructural information. In the formal context returns from the Deeds Office could be forwarded to municipalities to update the ownership database.

In the informal context, information gathered, whether symbolised, geo-coded or approximated should be included in the system. Discussing sustainable local registries Fourie (1998A:60) argues that "...local land administrators, linked to professionals in the land industry, could become the effective communication channel which improves participatory management and assists the transformation of the regulatory frameworks to the point that the informal and formal systems can form an integrated system." I argue that the role of these land administrators could be adapted to train communities to cooperate in a framework formulation designed to assemble and maintain land use information for SDSS. The land administrator could be employed by a local authority to record informal transfers and land uses approved by local committees in terms of simplified land use codes, as well as observed unauthorised uses. As informal development is formalised and integrated into local authority procedures over time, these records could be integrated with other more formal data maintained by the local authority and upgraded to comply with standards required by the computerised data bases maintained by the local authorities.

4.9 Conclusion

I have outlined a framework for SDSS designed to assemble, maintain, analyse and present land use information primarily to speed up land use development approval and regulation. I have shown that the framework should be capable of accommodating a variety of reference frameworks by spatially locating land use information by means of geo codes or land parcels. It must enable decision makers to visualise land use on the ground, and when computerised, should provide the means to analyse information and develop different scenarios.

The present centralised 'top-down' land management system is still in place and largely unaffected by the new land legislation discussed in chapter 3. This is in large measure due to the lack of land use information to inform the new more participatory land management policies envisaged, and the continuing reliance, by local and regional government, on the remaining underlying land law that still controls land development and regulation. Decision makers are not directly accountable to land users for the land use decisions taken or not taken. Management and staff continue to apply policies that ignore development that does not fit the mould, rather than embracing new methods and adapting procedures to the spirit and intent of new land law.

Local authorities rather than trying new methods of community oriented land management to improve delivery tend to react very reluctantly to the new procedures outlined in new legislation. Land use information to inform decisions is often not available and proposed changes to land management procedures are coming from central government with only limited input from the local level. By using participatory community oriented approaches to implement frameworks for SDSS, which mirror land use on the ground, as a land management tool to integrate informal and formal communities, decision-making at all levels would ultimately be more informed, more widely accepted, and will ultimately provide better guidance from the bottom up for the continued evolution of the countries land management policy.

A framework for SDSS formulated with the features and characteristics outlined above will be able to accommodate the criteria listed in chapter 1 as objectives for the research. The provision of land use information within such a framework will, firstly, enable faster processing of development applications and more efficient land use regulation. Secondly, have the ability to function as a land management tool by involving communities in maintaining the system thereby assisting to integrate formal and informal development over time. Thirdly, provide mechanisms for keeping both authorised and unauthorised land use information current, and fourthly develop links with other government agencies.

Chapter 5

CASE STUDY AREA, THE TOWN OF LIDGETTON WEST

5.1 Introduction

The need for a SDSS that is capable of recording detailed land use information for both existing formal and informal development, was highlighted in Lidgetton West by the difficulties the local authority experienced approving and regulating land uses in a small town with formal and informal development existing in close proximity. In the first section of this chapter I describe a brief history of the town of Lidgetton West which is used as the case study area for this dissertation. This includes the history of its informal settlement areas, the hostility between the informal and formal residents and the public land management institutions responsible for the area. In the next section of the chapter I explain the planning process and methodology of how the local authority, together with the local communities, agreed on the design of the questionnaire that was used to collect the land use information required to initiate the housing project. Details of the mapping used to provide the spatial component of the information is then briefly outlined. Finally the local integrated development planning process used to develop new more appropriate land use development standards and a new local land use management system acceptable to both the formal and informal communities of Lidgetton West is outlined.

In the previous chapter the design and characteristics of a framework for SDSS capable of providing land use information to improve land use approval processes and regulation was outlined. The need for low level decision-making, decentralisation and the adaption of institutions to support such a framework were discussed in chapter 2. In chapter 3 the legislative framework for land use approval and regulation in South Africa and particularly in KwaZulu-Natal, was examined. It was shown that the intention emerging from the new land legislation is for local authorities to regulate land use development in a legal environment which makes provision for a system of cooperative governance. This system is an attempt by government to reform the present 'top-down' land management approach by moving the responsibility and accountability for land use decision making and regulation to the local level closer to the land users. Implicit in these intentions is the need for land use information to support local decision makers. This need for land use information to speed up land use development, enable better land use regulation and educate informal communities about land management processes, will be highlighted in this case study.

5.2 History of Lidgetton West

The town of Lidgetton West is situated in the KwaZulu-Natal Midlands some 20km north west of Howick on the old main road (See figure 1 below).

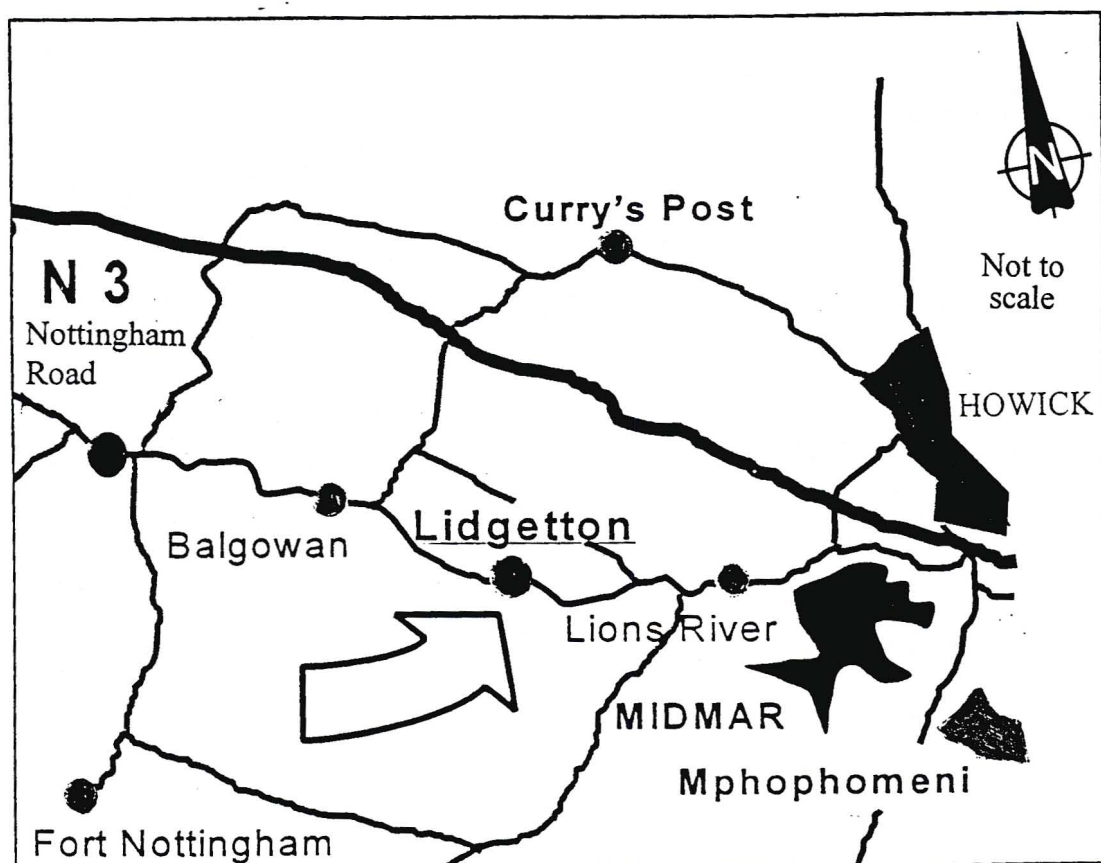


Figure 1. Location of Lidgetton West

The town was established in 1850 to accommodate approximately 300 settlers brought to South Africa by John Lidgett (Ralls, 1934). Settlers were allocated sites in the township which was originally called Lidgett-Town. For farming purposes the settlers were also granted, agricultural allotments of between 20 and 50 acres. These allotments were situated to the north, east and south of the township and are still apparent in the cadastral boundaries of present day maps. The 32 ha. township remained largely undeveloped as most of the settlers moved away from the area when diamonds were discovered in the late 19th century (Interview with John Lidgett, Grandson).

Until 1996 development in Lidgetton West comprised a number of formal houses, a station, railway line, high school and a number of long standing wattle and daub homes erected on lots rented from absentee property owners. Commercial activity was confined to 2 general dealers and a bottle store located alongside the main road. (See figure 2 above) The post office that served the area was closed during the early 1990's. The infrastructure to service this development consisted of formed hardened township roads, open stormwater channels and a small waterworks providing reticulated water. See generalised plan below showing the location of residential and commercial uses in Lidgetton West.

informal community and the adjacent farmers, small-holders and ratepayers.

5.3.2 *Lutchmans*

Approximately 1 kilometre to the north east of Lidgetton West is a long standing informal settlement of some 130 families situated on privately owned agricultural land which was one of the original agricultural allotments for the settlers. This settlement, popularly known as Lutchmans is on land owned by Mrs Lutchman. Interviews with residents in the area lend credence to the view that expansion of this settlement took place during the 1980's when violence wracked Mpophomeni township some 16 km away outside the town of Howick. Residents from this area fled to this settlement and have remained ever since. The landowner of the smallholding on which this unauthorised irregular settlement is situated collects rent from the occupants. Representatives from this community were represented at the community meetings held in Lidgetton West and at their request were included in possible upgrading proposals in the area. As the informal Lutchman development took place on agricultural land the KZNPA was the responsible land management authority for the settlement at that time. The KZNPA supported the proposed relocation of the Lutchmans into the Lidgetton West housing project.

5.4 Present Administrative Structures for land management in Lidgetton West

5.4.1 *Development and Services Board*

The Development and Services Board (DSB) is a statutory body established in terms of the Development and Services Board Ordinance No. 20 of 1941. It was set up to provide local authority administration and services to emergent urban areas. In 1973 Lidgetton West was declared a 'development area' and placed under the jurisdiction of the DSB which was recognized as a local government body by the Local Government Transition Act No. 209 of 1993.

The DSB, as the functional local authority at the time, was well equipped with considerable staff and resources. These include professional staff that provide the necessary engineering, survey, planning, financial, valuation and administrative skills to communities without any formal local authority administration. A Board, appointed by the Minister of Local Government, the equivalent of a local council, was the decision making body. It was informed by the Chief Executive Officer and the Directors of the Engineering, Planning, Finance, Health and Administration Departments who formed the Executive. The vertical management structure and the remoteness of this Executive and Board, who were the decision makers for all land use approvals not specifically permitted in terms of land development legislation, meant that there was little accountability to the land users.

Day to day functions and community liaison was managed by a District Managers Office. This staff had the responsibility of holding regular meetings with the different elected Advisory Committees of different areas and was directly responsible for any staff on the ground dedicated to a particular area. The District office, with assistance from head office staff, where required, was also responsible for the collection of money for whatever services were provided, as well as the maintenance of existing infrastructure. This District Office has been disbanded as recent legislative changes affecting local government take effect. The future of the DSB, now known as uMsekeli, is uncertain and since the local elections of December 2000 is no longer recognized as a local authority. The present vision is that the DSB staff, I continue to use the former name for the sake of clarity, will be reduced by retrenchment or transfer to local authorities. A small component is to be retained by the KZNPA to monitor consultants and contractors engaged to perform local authority functions for municipalities lacking the necessary capacity.

Since the local authority elections at the end of 2000, a newly constituted local authority, the uMngeni municipality (KZN 222), was charged with taking over the provision of existing local authority services within its new boundaries. The Municipal Systems Act required this new authority to prepare an Interim Integrated Development Plan by the end of March 2001 and an Integrated Development Plan by June 2002. These plans will be the instrument that will inform the allocation of government funding for future capital and infrastructural development. During the changeover period which expires in June 2002 the DSB is continuing to ensure that day to day water, financial, planning and engineering services are provided. By the end of 2001 the DSB was working closely with the new local authority (KZN 222) to whom all the information and records necessary for administering and regulating land in the town, had been given. The four main information structures used in the DSB are outlined below

a) Administration

The DSB has a central registry, as well as valuation and estates registries all responsible for different types of information. These sections maintain manual filing systems, updated valuation and property rolls and leases of Board property and land respectively.

b) Finance

This department is responsible for administering accounts for all service charges and rates.

c) Survey, land use planning and cadastral

Correspondence on all development applications, land use approvals and approved projects is kept in the central registry. Copies of town planning schemes and cadastral plans (based on data from the national cadastre) of managed areas were updated, maintained and stored in a central drawing office equipped with a CAD system. See annexure on page 91 for an example of the cadastral area map compiled for Lidgetton West. All these activities are the responsibility of the Engineering Department.

d) Engineering and infrastructure

Copies of the plans for all capital works, design and existing infrastructure were kept in the central drawing office under the direction of the Engineering Department.

All correspondence and plans are filed by the DSB in either the central registry or the drawing office. The financial section administers services charges and rates property in accordance with the valuation rolls compiled by the Valuation Division. This system is based on the cadastral and ownership information from the Surveyor General and Deeds Offices. This means that informal ownership and the names of those renting land are usually not known by the local authority. A detailed cadastral map of the town, based on information from the Surveyor General was maintained. Records are kept of what land use applications are approved but these are not recorded on an area map. Land uses are seldom checked on the ground and unless complaints are received, what is actually happening on the ground is often not known by the local authority.

5.4.2 Advisory committee

The advisory committee of Lidgetton West was a non-statutory body elected by the ratepayers of community. This meant that the informal community had no representation on this body. The Advisory Committee had no statutory authority but served as the channel of communication between

the community and the local authority. Its function was to provide local input to the DSB on land development and budget proposals for the town through regular meetings held with the District Office. This advisory committee ceased to exist when local authority elections were held on 6 December 2000. The town is now represented by elected councillors in both the district and local municipalities.

5.4.3 Regional and District council

Up to the local election on the 6 December 2000 local services provided by the DSB were subject to approval by the then Regional Council and the KwaZulu-Natal Provincial Administration. After the local elections Regional Councils, and existing Transitional Local Councils were reconstituted as District Councils and Local Municipalities in terms of the Municipal Structures Act. In this area they are now known as the uMgungundlovu District Council (DC 22) and the uMngeni Municipality (KZN 222). At this stage it is not yet clear how the role of district councils will be accommodated with that of the KZNPA. If these two bodies are not amalgamated district councils although nominally local authorities could be deemed to be a fourth level of Government. In the past the KZNPA provided land management expertise for all areas outside Local Authority control as well as support for local authorities if required. In terms of the new legislation all land falls within a local authority area and it would seem that this role is to be undertaken by the newly constituted district councils. This will conceivably result in the role of provincial government being reduced to one of co-ordinating and supporting district councils in fulfilling their role of supporting land management and local authorities.

5.4.4 Lidgetton West Development Forum

Before any decisions to address the problem of uncontrolled settlement in Lidgetton West could be taken, agreement between the towns antagonistic communities (formal and informal) and officials, had to be reached. The perceptions of the different parties about the need for information about the location and origin of informal settlers varied. These perceptions were coloured by the interests of the different parties. The local authority needed the names and origins of settlers to administer and plan for existing services and social needs and develop an acceptable solution to the housing problem which was manifesting itself in informal settlement. Established farmers had fears of a large influx of people from outside areas creating a large settlement which could have attendant crime problems. They accepted that some form of housing was required to address the problem of homelessness in the area but feared a lack of control would result in an influx of persons with no history of association with the area. The informal settlers feared that the information could be used as the means to prevent their continued occupation of land and that development initiatives would result in an escalation of living costs.

To address the problem the planning department established the Lidgetton West Development Forum (LWDF). Initially separate meetings were held with the informal settlement representatives and farmers and ratepayers as both parties were at loggerheads and boycotted meetings. It was finally agreed to establish a forum, on which representatives of all stakeholders in Lidgetton West and district would be represented. At the communities request this included representatives from the Lutchman settlement. All negotiations about the future of the informal residents of Lidgetton and Lutchmans were thereafter conducted through this forum. Initial meetings of the forum were held at a neutral venue away from the town at the request of the communities. As trust between the different factions was established the high school in the village became the accepted venue for meetings. All agreements were subject to agreement by the DSB and the other relevant regional authorities.

A rudimentary form of PPM or PRA was used to achieve this agreement. Once agreement had

been reached close links between the local level decision makers and the local authority were imperative if fast informed development decisions, based on the agreements reached, were to be made and implemented. Unfortunately these links were not developed and this resulted in protracted delays to the implementation of projects and land use control in the area. The use of PPM techniques to assemble land use information also highlighted the restrictions imposed by the present institutional structures and systems. The experience from the case study showed that the use of community oriented systems in land management required a degree of restructuring outside the administrative system of the DSB. The approach was seen as threatening to the existing institutional hierarchy and resulted in an unwillingness by officials to officially recognise the possible merits of such an approach. Difficulties were also encountered with the socio-political structures at the local level which viewed the moratorium and allocation of housing units as threatening to their interests. This suspicion from both the formal and informal authorities in Lidgetton West was largely responsible for the lack of institutionalising an effective local system to maintain the socio-economic information required to maintain the data collected to inform the housing project and regulate land usage in the informal or irregular area of settlement.

In the case study area, one of the results of using low level land use records to inform decentralised decision making closer to affected communities, was that local authority decision makers were more accessible and accountable to the communities served. This was seen as threatening and prevented further development of participatory processes. The process did however develop closer communication links between the local authority and the different communities in the area. For this process to be effective there needed to be a devolution of the function of existing land development and regulation systems to lower levels of government. Because of the widely differing socio-economic status of different communities in South Africa the role of non governmental organisations (NGO's) to inform and assist community structures in civic affairs is an important one. Although no NGO's were active in Lidgetton West the importance of their role in assisting communities in organising themselves needs careful consideration, especially in view of the limited budgets of local authorities. The social benefits that could accrue to the state in return for limited funding of this type of role for NGO's needs further research.

After negotiations in the LWDF it was agreed that a socio-economic survey should be conducted by the DSB, together with members from the informal communities, for the purpose of establishing a housing beneficiary list. It was also agreed by all parties that no further invasions would take place and that all farm evictions would be stopped so that alternate housing for the landless people in the district could be provided in the village. The Lutchman community agreed to be relocated into Lidgetton to maximize the benefit of the existing infrastructure in the village. A layout for a township of 340 houses was prepared and a local farmer agreed to sell a portion of his farm for this purpose. These proposals were agreed to by the Board, the KZNPA, and the then Regional Council. Funds to augment the existing inadequate water supply were then secured and an additional reservoir and dam are in the process of being built. The decision was then taken to appoint a consultant to finalise the Provincial Housing Board application and proceed with the detailed design of the proposed housing development.

5.5 Planning process

I became involved in the area as the DSB planner for the town and was directly involved in efforts to develop solutions to address the tensions that arose as a result of the uncontrolled informal settlement in the area. As outlined above agreement was reached with the different communities to stop both evictions and uncontrolled settlement. This agreement was necessary to enable the planning of a housing project for the informal settlement residents and landless poor people living in the

district to proceed. The need for spatially referenced current land use information, which included social information about the informal residents as well as those families facing eviction from farms in the district, was highlighted as consensus on possible solutions was reached. Based on experience in other upgrading projects, it was decided to workshop the type of land use information required as well as its method of collection. A questionnaire was designed together with the informal community and it was agreed that DSB staff, together with an informal community member, would conduct a house to house survey to ensure that the correct information was captured. This exercise was successful and raised the awareness of all the affected communities to land use and land use regulation issues. The only detailed mapping available was a cadastral map of the town. To spatially link the socio-economic information to provide a land information record, an aerial photograph and a frame from an aerial video were used. This process is explained below in the section on mapping.

5.5.1 Land use information records

In Lidgdetton West there was a lack of spatial information about the location of the informal development structures, land use and socio-economic information. As outlined above it was decided that a questionnaire administered jointly by DSB staff and informal settlement representatives was the best method of ensuring that the number and location of families was reasonably accurate. The following spatially related land use information was included so that a housing project and land use development and regulation could be managed effectively.

- ▶ proposed and existing land use zones
- ▶ actual use of property -authorised or unauthorised
- ▶ position of utilities (water, stormwater sewers, street lights)
- ▶ state owned land
- ▶ geo technical data and flood lines from geotechnical report
- ▶ topography, contours interpolated from the South African 1:10 000 orthophoto series.
- ▶ position of buildings
- ▶ positions of informal shacks which are uniquely numbered
- ▶ township and access roads

The following textual socio-economic information was linked to the above spatial data after it was agreed with the informal community that income and identity numbers would remain confidential. The links used were parcel numbers and the unique numbers given to each informal shack.

- ▶ names of household heads in informal settlement and identity number
- ▶ marital status
- ▶ income of household head and total for household
- ▶ number of people in household
- ▶ number of children under and over 12 and the over 60's (important for education and welfare authorities)
- ▶ date of arrival, reasons for settling and place of origin. (ratepayers and surrounding land-owners feared uncontrolled settlement in the area if the housing project was open to non-residents)

The initial socio-economic information about the occupants of the informal housing that was gathered in the initial survey of the towns informal development was not updated. There was no mechanism in place to do this and to the DSB the information served no purpose other than to inform the funding application for a housing project. Although this outdated list of beneficiaries will be updated once families are allocated new homes, the local authority will have no information about whether the

beneficiaries have come from Lidgetton West, as agreed by the LWDF, or are outsiders. Whether or not all the occupants of the existing shacks and long time residents in Lidgetton West have all been included in the proposed housing scheme will only become apparent once all the housing allocations have been made. It also meant that the local authority has no record of structures erected and occupied since the moratorium, and therefore no means of honouring the agreement that only people already living in Lidgetton West could be considered as housing beneficiaries.

Adequate information about the residents in the formally developed area of Lidgetton West was readily available from a valuation roll which lists the current owners, land parcel descriptions and whether the parcels are vacant or developed. Detailed information of the actual land uses in the town were however not readily available.

5.5.2 Mapping

The local authority (the DSB) maintained a cadastral base map of the town based on cadastral information from the Surveyor General. This base map was accurate and was ideal for the management and regulation of formal development in the town despite the fact that the only land use information on what the land in the town was being used for was contained in a valuation roll and from filed records of approved land development. No information was available for the informal development in the town. To provide a spatial component for the socio-economic information collected about the informal settlement an unrectified aerial photograph and a frame from an aerial video of the town were used. Using these images the position of the shacks was interpolated onto the cadastral base map using features such as the township roads, the Lions river, the railway line and road and river bridges. This information was then transferred onto a copy of the basic cadastral map using a CAD system. Although the map produced was not accurate it did present the generalised spatial pattern of the informal development as it relates to known geographical features and the underlying cadastral information. Each individual shack was uniquely numbered. These numbers were used to spatially link the recorded socio-economic information of the informal settlement. It had initially been hoped to use a GPS to provide greater relative accuracy of the shacks to known geographical features. Unfortunately no GPS system was available at the time and the use of conventional survey methods was too expensive, so a generalised map, based on the cadastral base map of the town was prepared and found to be adequate. This proved successful in workshops in which the location of future housing proposals were negotiated together with the communities in the case study area. It is unfortunately not possible to include a copy of the generalised map outlined above as all copies were handed over to the newly established KZN 222 local authority in January 2001. Since construction of the housing project began they have been lost or destroyed.

5.5.3 Local Integrated Development Plan

Concerns were raised by all the local communities about the impact that the development of 340 low cost housing units would have on the towns land administration system. Because of these concerns it was decided that a Local Integrated Development Plan (LIDP) for Lidgetton West was required. The plan was to take cognisance of any existing plans, identify future projects, define appropriate standards to be applied to simplified development or land use codes to regulate development and economic activities in both the formal and informal areas of the town. The fact that no fewer than four plans, which include the Regional, Sub-regional, Howick Corridor and Midmar Catchment plans, all of which have a bearing on land use development and overlap at Lidgetton West is indicative of the complexity of land use regulation. After numerous workshops and consultation with stakeholders a LIDP for Lidgetton West was prepared. A participatory process was used to allow

representatives of informal residents, ratepayers and surrounding farmers to establish appropriate criteria for the different land use activities to be permitted in specific land use areas identified in the town.

The LIDP also proposed that the local community should be more involved in decision-making to resolve their housing problems as well as the regulation and administration (management) of land uses. Unfortunately, although the preparation of local development plans was mandatory, and funding for the process was provided by the KZNPA, there was no existing legislation giving the plans any statutory authority and the proposals contained in the LIDP could not be implemented (letter from KZNPA in response to application for authority to implement Integrated Local Development Plan for Lidgetton West at the end of 2000).

The value or function of the LIDP prepared has therefore been limited to informing the integrated development planning process required by the Municipal Systems Act. The LIDP was used to inform this process being undertaken by the new local authority known as uMngeni Municipality or KZN 222. No mechanisms exist or have been established at the local authority level to ensure that the currency of land use information collected during this process will be maintained. As a result the land use information in these plans will quickly become outdated and useful only for the purpose of providing a historical perspective. The concept of a local authority level SDSS framework, designed to assemble and maintain land use information for SDSS as outlined in the previous chapter, could fill this land use information void existing in local authorities.

The process of developing a housing project and preparing the LIDP highlighted the importance of land use and socio-economic information, its spatial relationships, and the need to keep it current for land use decision-making and the administration of service payments. The need for coordination between the three different authorities (local authority, district council and regional government) legally responsible for land management in the case study area also emphasised the importance of access to current land use information in formats that each could use to inform land use decision-makers in the different levels of government.

The need for new land management tools to address the land management problems facing the local authority in both managing and integrating informal and formal land development and the approving and regulation of land uses into a viable effective system also became evident as negotiations about the housing project in the LWDF progressed. An application to keep livestock (goats) on a residential lot in the formal area of the town was refused while in the informal area residents conducted whatever activities were needed for survival including keeping livestock. This was one example of regulating land use that led to ratepayers accusing the local authority administration of applying double standards. Others included the flouting of building regulations and the non-submission of plans and applications for houses and commercial activities in the informal areas of the town.

From my work as a planner in a local authority and the events outlined above, one characteristic for the formulation of a framework for SDSS in land use planning should be the involvement of the community in acquiring and maintaining land use information. It could be an economic means of both educating and empowering previously disadvantaged communities. This community involvement could also assist newly formed local authorities in resolving the difficulties that such authorities have traditionally had in collecting and maintaining the land use information necessary for efficient land management.

5.6 Privatisation

The lack of capacity of local authorities has resulted in the preparation of many land use plans being outsourced. This partnership can introduce specialised skills to assist public authorities with specific tasks and provide a valuable service. In this time of changing legislation and restructuring, local authorities have not developed a clear vision, or the political will, about how to integrate different communities isolated from one another during the apartheid era. No mechanisms to collect informal land use information or update existing land use information in the new municipal areas have been established. This has resulted in valuable existing land use information data bases becoming progressively less relevant to land management as time passes and circumstances change.

An example of this was the decision to outsource the development of the proposed low cost housing scheme in the case study area without establishing a system to record and manage the land use information necessary to monitor the moratorium and administer the list of beneficiaries according to the LWDF agreement. This resulted in the moratorium being unenforceable and irrelevant and the housing beneficiary list becoming outdated. Liaison with the community was not seen as necessary by the local authority once broad agreement had been reached on the proposed housing project. As a result communication with the formal and informal communities suffered. Rather than being invited as participants in the process of compiling and maintaining the housing beneficiary list catering for applications from local residents, applicants were merely recommended for approval by the dominant forces within the community without either the consultant or local authority knowing whether or not they qualified as local residents in terms of the agreement negotiated in the LWDF.

Two of the basic principles outlined in the RDP White Paper(1994:6) were that "...an integrated and sustainable programme" was required and that it "...must become a people-driven process." The Local Government Municipal Systems Act (no.32 of 2000:18) more recently states that local government must try to;

- (a) develop common approaches for local government as a distinct sphere of government;
- (b) enhance cooperation, mutual assistance and sharing of resources among municipalities;
- (c) find solutions for problems relating to local government generally; and
- (d) facilitate compliance with the principles of cooperative government and intergovernmental relations.

The Local Government Municipal Systems Act (32 of 2000:20) also encourages municipalities within their means to "encourage the involvement of the local community."

If the outsourcing of specialised municipal functions is to be effective local authorities must have a clearer vision of how the local community is to be involved in this process. They must also establish mechanisms to maintain the land use information collected by private practitioners. From the above, one function for the local authorities to apply to SDSS in land use planning should be the ongoing maintenance of land use information assembled by private practitioners.

5.7 Conclusion

I have briefly outlined the history of Lidgetton West and the causes of informal settlement in the town and on the nearby property owned by Lutchman. Details of the system of local government applicable in the town, against the background of the national restructuring of local government and land use management in South Africa, has been explained. The planning process and negotiations with the informal communities in and near Lidgetton West, to develop a solution to the unauthorised informal

settlement and land use approval and regulatory problems that the local authority land management system had to deal with, have been highlighted. These include a lack of land use information exacerbated by inappropriate land development standards, and a remote cumbersome decision-making structure distant from land users. These problems resulted in a lack of accountability for land use decisions taken, long procedural delays, slow decision-making and the inability to effectively regulate land uses in both formal and informal communities.

If land use information is to be managed in effective ways it must be seen as beneficial by both the communities providing it and the local authority. Experience in the case study has shown that residents are more committed to supporting land use information systems if they are informed of the value of land use information, why it is required and how it can be of benefit to them. This was shown by the cooperation of both the formal and informal communities once agreement had been reached about what and why land use information was required to inform the development of a housing project.

The approval and regulation of different land uses within a local authority area, whether with or without the subdivision of land, is tightly controlled by plethora of legislation. This system is foreign to many of the urban and rural poor who see the system as conferring no benefits to them. As can be seen in most areas of South Africa informal development with its own unauthorised informal systems of social control do exist. The dynamics of these systems vary and will not be discussed here. As argued by Durrand-Lasserve (1997) cognisance needs to be taken of these informal systems which should then be incorporated into the formal system of land use management of local authorities. In the case study I have shown that appropriate land use development and regulation standards acceptable to all communities can be developed and agreed to. This is a prerequisite if a SDSS is to be successful and useful as a land management tool capable of assisting with the integration of existing formal and informal land management systems.

A developing problem highlighted in the case study and exacerbated by the restructuring local government in South Africa, is the privatising of many local authority functions without first ensuring that local authorities have the necessary systems or expertise to record and maintain the land use information generated and collected. If SDSS to record and maintain land use information are not established by public authorities a situation where this information, paid for with public funding, is concentrated in the hands of private companies could arise. This would give these companies a monopoly on the land use information local government requires to fulfill its responsibilities for providing efficient, responsible and cooperative local government. In the concluding chapter that follows I will summarise the chapters of the dissertation and highlight the functions and characteristics of a SDSS in land use planning. I then identify other possible areas of research and discuss conclusions drawn from this study.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The focus of the dissertation has been on the formulation of a framework for SDSS to support land use planning and land use regulation at the local government level. The research is based on a case study of the small town of Lidgetton West situated in the KZN midlands. A proposal to develop a low cost housing project to address the housing problems of the informal residents in the town and adjoining district raised important questions about the effectiveness of the present 'top-down' land information management systems of local authorities. These questions include the currency and availability of land use information to inform the approval and regulation of land uses in both the formal and informal environments. As literature on land use information is limited, observations and experiences in the case study have been compared to existing literature on LIS for tenure and resource management. The findings in this literature have been extrapolated and applied to developing the concept of a low level framework to assemble and maintain land use information for SDSS in land use planning. Important features that such a framework should include are: mechanisms to integrate the participation of both the formal and informal communities into the process of assembling and maintaining land use information to approve and regulate land use; the incorporation of local knowledge; and, the presentation of information in a manner that supports decision makers by presenting different possible solutions.

6.2 Summary

6.2.1 Chapter One

A brief introduction to the restructuring of local government in South Africa that has provided complete coverage of the country with some form of local authority control, by means of either or both, a district or local municipal authority, has been given. This was followed by a review of the dissertation which included its context, scope and object. Four criteria that a local level framework for SDSS should accommodate if it is to be an effective land management tool supporting land use planning were listed as objectives of this research. Comment is made on these in the summary of chapter 4. Brief outlines of the contents of the following chapters conclude chapter 1.

6.2.2 Chapter Two

The present 'top-down' local authority land use control systems are increasingly ineffective. They have proved unable to cope with rapid urbanisation and informal settlement, the need for the timely release of land for development, and the regulation of its use in both the formal and informal contexts. In this chapter low level participatory accountable decision making, supported by land use information provided by formal and informal communities, is proposed as a means of intervention to create synergies between them. In the land use decision-making environment technical solutions need to be balanced with ones that are socially acceptable. Such decisions are the result of negotiations between different stakeholders and a participatory planning and management process is proposed as the means for developing acceptable solutions. The types of land uses permitted and the standards for regulating them need to be negotiated to develop consensus between what is technically viable and socially acceptable if possible conflict over land and its use and regulation is to be avoided. I have shown that decentralisation of the present system of land use planning, and the need to move from a prescriptive

approach to a more integrative approach to managing land use information, are preconditions if a framework to provide detailed land use information for SDSS in land use planning is to be successful. The availability of current land use information to SDSS should enable them to support improved, faster and more responsive systems of land use approval and regulation.

The different institutional levels of land use management and land use planning are discussed and four principles have been identified when existing top down institutions are adapted. These principles are that there should be, firstly, an input of information from all bodies to decision-makers, secondly, transparency of decision-making criteria, thirdly, delegation of non-policy decision-making as close to the land user as possible, and fourthly, an ongoing review of the process to ensure effectiveness (UNCHS:1991:84,85).

6.2.3 Chapter 3

In this chapter the complex array of laws applicable to the development and regulation of land are examined. This array of laws is complicated by the fact that in terms of the Constitution many of the apartheid land laws and regulations remain in operation until repealed by a competent authority. This examination of the legislative framework controlling land use approval and regulation as well as legislation reforming the structure of local government in South Africa highlights a number of problems that affect the availability and management of land use information necessary to inform land use decision makers. These include the presence of various different land use regulatory systems, the use of inappropriate development standards and an emphasis on controlling rather than facilitating development. The KwaZulu Land Act and the Ingonyama Trust Act are examples of the complications involved in releasing land for development in historically deprived areas.

The White Paper on Spatial Planning and Land Use Management attempts to address these problems and outlines principles and norms for land development, planning, and decision-making in all spheres of government. The regularisation and upgrading of informal settlements and the facilitation of the development of land through municipal participation are included as functions of land use management. The new land laws controlling land development and regulation support the principles of cooperative and participatory governance. It is proposed that local government be responsible for taking decisions on land development applications and regulation in their areas. This is in accord with the long term vision of the South African Land Policy for land administration to take place at the local government level. If the decentralised, cooperative and participatory governance envisaged is to function effectively the provision of land use information by local authorities to inform land management decisions is a priority.

6.2.4 Chapter 4

In this chapter I review literature on LIS and outline the functions and features of a framework for SDSS to provide land use information to support decentralised land management at the local government level. The conceptual model of the SDSS framework must model the real world and be capable of providing local information and adding value to existing information systems. The objective of the SDSS is to make land use information available to support decision-making for land development and land use regulation. To do this effectively its design should be directed to ensure that it has the means to share land use information in a multi-user environment.

An effective framework for SDSS should make a provision for land use information to support the following functions. Firstly, the identification of the resources and constraints facing development in local areas. Secondly, the locality of owners to improve service cost recovery and provide a record of possession. Thirdly, identify actual and zoned uses and possible areas of conflict. Fourthly,

maintenance and management of infrastructure. The system should also make it possible to integrate formal and informal community processes and local knowledge into the system.

Based on a review of literature about implementing information systems it is recommended that a framework for applying SDSS in land use planning should focus on outlining provision of land use information to support local decision-making bodies to speed up land use approvals, be capable of being developed incrementally and could include both manual and computerised land use records. As cadastral coverage is not uniform, the data reference framework for SDSS should accommodate both land parcels and geo-codes to spatially link the whereabouts of land and its uses.

I have shown that the features and characteristics of a framework for SDSS that is decentralised and uses participatory approaches with local communities could fulfill the four criteria specified for it in chapter 1. These criteria are firstly, the provision of land use information to speed up land development applications and promote more efficient land use regulation whether cadastral information is available or not. Secondly, the use of the SDSS as a land management tool to assist with the integration of formal and informal land use approval and regulation systems by developing a partnership between formal and informal communities (discussed in chapter 2). Thirdly, the establishment of mechanisms for maintaining current land use information and fourthly, the creation of linkages between local authorities and other tiers of government to add value to their SDSS in land use planning by providing reliable current land use information.

6.2.5 Chapter 5

In this chapter the history of Lidgetton West the case study area is briefly outlined. The structure of the DSB, then the local authority, and the remoteness of its land use decision makers, for all but routine development approvals, typifies 'top-down' land management and its lack of responsiveness. This chapter highlights the difficulties facing local authorities in approving and regulating land use in both formal and informal environments. The planning process and methodology of how land use information was assembled by the local authority to inform a low cost housing project is described. As no GPS was available and development had taken place without regard to existing cadastral boundaries, the position of the structures were interpolated onto an accurate cadastral map of the area by positioning them relative to the position of known features such as township roads, bridges, a river and railway. The generalised map created in this manner was found to be adequate for spatially linking the textual data and provided the basis for stabilising the informal development so that a housing project could be planned

To resolve the conflicting land use approval and regulatory demands being made on the DSB by the formal and informal communities, appropriate standards for development acceptable to both the formal and informal communities in the area were negotiated during the preparation of a mandatory LIDP. The intention of this plan was to provide a framework to adapt and decentralise the existing land management structure of the DSB in the case study area to permit low level decision making. This process could have fostered greater understanding between the formal and informal communities and over time the land management of both communities could have been integrated into one formal land management system. Unfortunately existing legislation gave the LIDP no legal status and it could not be implemented (letter from Department of Traditional and Local Government Affairs).

6.3 Conclusions

In land development the law is used to direct or control the struggle over resources and the different uses of land. Any land laws or proposed land laws are based on political and policy issues, not just technical ones. (UNCHS:1991:21,22) As much land development in both the towns and cities of SA

has disregarded formal law processes "one of the most important issues to be addressed ...is how the formal and informal systems of law can be reconciled with each other so that official recognition can be given to land development carried out by the urban poor in disregard of the official law"(ibid:7). I have shown that implementing a framework for SDSS in land use planning could assist local government in the approval, administration and regulation of land use development in both the formal and informal systems in a manner which will be accepted by both these communities. It could also provide land use information capable of being formalised into the recognised existing formal land management information systems over time.

On land used for residential purposes in the informal system, land usage often does not comply with historically accepted norms and standards. The uses to which land is put are often necessary for survival and forced on the poor by poverty. These uses may or may not have the social sanction of the community in which they take place. If they are in conflict with accepted land use policies and planning norms public authorities either, endeavour to stop the activity, or if this proves impossible, because of the political or social circumstances, turn a blind eye to the activity.

This introduces the argument that if no action is taken against illegal occupiers of land, a form of consent could be deemed to have been given by the landowner and a distinction between informal and illegal occupation is introduced (Davies:1998:86). "...If action against illegal occupiers is not taken, informal residents could argue that the local authority or private landowners gave their consent to the continued occupation of the land" (ibid). This argument could be extended to unauthorised survival land use strategies employed by the poor which are frequently ignored by development authorities if they do not impinge on authorised formal development. This argument implies that informal development needs to be managed more effectively. As shown in the case study, action taken to address the informal settlement that had occurred committed the Local Authority to developing a practical and acceptable solution. If the local authority level is to do this effectively, existing 'top-down' land management practises have to be adapted and more efficient methods of collecting land use information need to be developed. I have shown that a framework for SDSS designed to maintain and analyse this information and involve all communities in the land information management process could support better land management at this level.

If informal development and land usage is given some form of official recognition, standards have to be redefined whether they be for infrastructure, levels of service or the criteria used to formulate the land use regulations that regulate the type and standard of economic activities that may be undertaken in developments. As observed by Durrand-Lasserve (1997:10) "standards usually reflect an idealised model of planning. They were almost always created by and for centralised and centralist systems of urban management. ...Many of the supposed standards have no legal basis, rather they are mere internal administrative regulations." He goes on to say "...that the strongest resistance to change arises from the difficulty of getting new standards for planning development and secure tenure accepted by state administrations, by professionals and urban management technicians, and by large sections of the middle classes" (ibid).

The proposal that was developed to provide housing for some 340 informal families settled in the Lidgetton area posed a real problem about what standards would be applied to land use approvals and how land use regulation in the area would be administered by the DSB. The community in the case study area is comprised of two distinct sections. The formal section with knowledge of civic responsibilities and functions and the informal section with little knowledge of civic responsibilities and functions.

De Wit (N.D:8) lists the following "factors which may positively influence the attitudes and actions of land users and communities towards resource conservation"

- ▶ education to raise awareness to possible future consequences of unsustainable land use.
- ▶ creating local accountability, (not only participation) for resource conservation.
- ▶ direct benefits and immediate returns on investment for the community and the individual land users who apply conservation methods
- ▶ operational social and legal sanctions of customary resource management systems, for non compliance with land management decisions; this could encourage social control and pressure for sound resources management by reducing the distance between decision makers and users.

Land management authorities, particularly local authorities faced with incorporating varying degrees of formal and informal development into a single land use management system, need to be actively encouraged to consider these four factors when implementing a framework for SDSS in land use planning. The importance of low level decision-making, decentralisation and the adaption of institutions to change the existing 'top-down' land management planning systems was discussed in chapter 2. By using the concept outlined for a framework for SDSS as a land management tool to accommodate formal and informal land use approval and regulation into a single effective system, the factors listed by De Wit as positively influencing land users and communities actions towards resource conservation will be encouraged. I have shown that these factors could also positively influence the attitude and commitment of land users and communities toward supporting a framework to inform new land management procedures.

Spatial organisation in a modern society relies on information and communication processes that generate a consensual public knowledge about geographical boundaries, locations and place names. Spatial knowledge underpins the rule of law whenever rules direct that particular actions are permissible or impermissible in particular places (Cook:1996:1).

Large scale rule governed behaviour "...depends on high standards of literacy to allow..." (ibid:2) the recording of rules, mass communication to establish social acceptance and "...substantial voluntary compliance..." (ibid) with the rules.

This study has shown that a participatory framework for SDSS, operating in an institutionally supportive environment could be a means to ensure that spatial knowledge can be used in both formal and informal communities to support the rule of law and establish a degree of voluntary compliance. I have shown that communities must be involved in the process of assembling land use information which is directly affected by the standards adopted for land use development and regulation. The operation of the SDSS and the standards agreed to must be acceptable to both communities and the local authority if social acceptance and voluntary compliance with land use rules is to be encouraged.

6.4 Recommendations

New approaches are being developed to address and regularise informal settlement. A city wide approach to informal settlement regularisation/upgrading is, according to international best practices, the best approach (Durand Lasserre:1997, Fourie:2001:4). I have shown that if such approaches are to be sustainable attention must be focussed on a SDSS framework for the collection and maintenance

of the land use information by the local authorities of the public sector. Local authorities are the closest level of government to the people and in the best position to maintain the information necessary to administer city wide approaches to land management and regulatory systems. If the concept of such a SDSS framework at the local authority level is to develop and be sustainable the following issues require further investigation and research.

Firstly, the need to establish standards and resolve copyright difficulties to permit access and use of existing data bases by local authorities to form the basis of core information to establish a framework for SDSS in land use planning needs to be developed. Secondly, can local level systems of land use information of varying accuracy from different sources be upgraded over time in the context of ongoing software development and restructuring local authorities? Thirdly, can SDSS records of occupation for service and land tax payments be used to facilitate a record of informal land transfers and rights of occupation?

6.5 Concluding remarks

Municipal land use planning has traditionally focussed on the regulation of land uses through town planning schemes, conditions of title and local authority regulations. As poorer communities are generally excluded from these processes the criteria developed to regulate land use cannot be effectively applied to them. I have shown that informal communities can be integrated into formal land management systems by using PPM approaches, as described in chapter 2, to assemble land use information and establish development and regulatory criteria. These processes can generate a basis for understanding, goodwill and the necessary information to benefit both formal and informal communities. It could also be the first step in establishing a framework for application to SDSS in land use planning which could be used as a land management tool to integrate the informal processes of land use approval and regulation into existing structures.



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